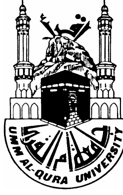


المملكة العربية السعودية
وزارة التعليم العالى
جامعة أم القرى



اللقاء العلمي الثاني
للجمعية السعودية للعلوم الفيزيائية

ندوة

الفيزياء بين النظرية والتطبيق
في المملكة العربية السعودية

٢٠/١٠/١٤٢٦هـ الموافق ٢٢/١١/٢٠٠٥م


بسم الله الرحمن الرحيم

مقدمة اللجنة المنظمة والندوة

الحمد لله رب العالمين، والصلاة والسلام على سيد الأنبياء والمرسلين
سيدنا ونبينا محمد وعلى آله وصحبه أجمعين.

يطيب لنا تقديم هذا الكتيب لملخصات ندوة « الفيزياء بين النظري
التطبيق في المملكة العربية السعودية » التي ينظمها قسم الفيزياء بكلي
علوم التطبيقية بجامعة أم القرى والجمعية العلمية السعودية للعلوم الفيزيائي
هي النشاط العلمي الأهم للجمعية تفعيلاً لدور الجامعة في مجال خدم
لمجتمع وتنشيطاً للبحث العلمي.

ولئن أضحى عام ٢٠٠٦م عاماً مميزاً لمن يعملون في مجال إسكا
حجاج بمكة المكرمة والمدينة المنورة كونه يضم موسمي حج ١٤٢٦
١٤٢٧هـ، فإن هذا العام ١٤٢٦هـ (٢٠٠٥م) يُعد عاماً مميزاً لقسم الفيزيا
جامعة أم القرى بمكة المكرمة. فالعالم يحتفل بالسنة الدولية للفيزياء والت
ختير شعارها ليكون (قرن بعد أنيشتاين ١٩٠٥ ـ ٢٠٠٥م)، ووزراءْ الثقاف
العالم الإسلامي اختاروا مكة المكرمة لتكون العاصمة الثقافية الأول
عالم الإسلامي، وقد أُذن ببدء الاحتفالية بهذه المناسبة قبل شهرين من هذ
ندوة.

ومنذ صدور الموافقة السامية الكريمة على إقامة الندوة برقم ٥٤٢٩/
بتاريخ ١٤٢٦/٤/١٨هـ وتشرف المنظمون بالرعاية الكريمة لصاحب السم
لكي أمير منطقة مكة المكرمة الأمير عبدالمجيد بن عبدالعزيز لفعالياته
م تشكيل اللجان العاملة للإعداد والتحضير لإقامة هذه الفعاليات والت
هدف إلى:

. تنشيط البحث العلمي في المجالات الفيزيائية المختلفة.

- تقوية الأواصر بين الفيزيائيين في الجامعات والمؤسسات المختلفة.
- دعم تأهيل الفيزيائيين للعمل في مجالات الصناعة والاتصالات.
- تنمية الموارد المخصصة للبحث العلمي في الجامعات والمراكز البحثية.
- رفع كفاءة مناهج الفيزياء في التعليم العام والعمل على رفع مستو
  المعلمين علمياً وتربوياً.
- تحقيق الوسائل المناسبة لتبادل الخبرات والإنتاج العلمي في المواضي
  الفيزيائية المختلفة.
- دعم الجمعية العلمية السعودية للعلوم الفيزيائية والعمل على زيادة المناشط
  والفعاليات الفيزيائية.

ضمن محاور خمس هي:

- الفيزياء النووية.
- فيزياء الجوامد.
- الموصلية الفائقة.
- الفيزياء الطبية والإشعاعية.
- الفيزياء البيئية.

وقد تم اختيار عدد من الأوراق العلمية والأبحاث للعرض على المدعوين
الندوة كأوراق ملقاة، إضافة إلى عدد آخر كأوراق معروضة (ملصقات)
تم ترشيح نخبة من علماء الفيزياء المسلمين بالجامعات الغربية والجامعات
عربية للحضور والمشاركة بمحاضرات رئيسة (Keynote Speech). حيث
بى دعوة اللجنة المنظمة سبعة من أفضل العلماء العرب والمسلمين في مجالات
ندوة المختلفة.

ولضمان مشاركة أكبر عدد من المهتمين من الفيزيائيين فقد تم توجيه الدعوة لكافة الجهات التعليمية والجامعية بالمملكة، كما حرصت اللجنة المنظمة على استضافة الزميلات من المتخصصات في مجالات الندوة بقاعة الجوهرة بقسم الطالبات بالجامعة ليشاركن ويسهمن متحدثات ومناقشات والحضور في فعاليات الندوة عبر الدائرة التلفزيونية المغلقة.

والله نسأل للجميع التوفيق والسداد، للندوة واللقاء بلوغ الغايات والأهداف، ولمن أسهم في التنظيم والإعداد الأجر والثواب.

﴿ وَقُلِ اعْمَلُوا فَسَيَرَى اللَّهُ عَمَلَكُمْ وَرَسُولُهُ وَالْمُؤْمِنُونَ ﴾ (التوبة: ١٠٥)

صدق الله العظيم

اللجنة المنظمة

كلمة مجلس إدارة الجمعية

الحمد لله والصلاة والسلام على رسول الله

يخطو الفيزيائيون خطوة جديدة للأمام في مؤتمرهم الثاني بمكة المكرمة حرسها الله، وفي رحاب جامعة أم القرى وتنظيم قسم الفيزياء بكلية العلوم التطبيقية في هذه الجامعة العريقة بمناسبة اختيار مكة عاصمة للثقافة الإسلامية، هذا هو اللقاء الثاني للجمعية العلمية السعودية للعلوم الفيزيائية الذي سبقه اللقاء الأول بجامعة الملك خالد في شوال ١٤٢٤هـ.

وقد سبق هذا اللقاء مناسبة أخرى في رحاب جامعة أم القرى وفي ذات القسم والكلية ألا وهي انعقاد أول ورشة عمل فيزيائية بعنوان « **جودة التأهيل في أقسام الفيزياء بالجامعات السعودية** »، هذه الورشة ستتلوها بإذن الله سلسلة متصلة من ورش العمل في جميع أقسام الفيزياء بالجامعات السعودية ومدينة الملك عبد العزيز للعلوم والتقنية ، وذلك من أجل تحقيق عدة أهداف من ضمن أهداف هذه الجمعية والتي من أهمها مد جسور التواصل العلمي والبحثي بين العلماء والباحثين في مجال العلوم الفيزيائية في وطننا الحبيب .

وفي هذا الدليل البحثي عينة من بحوث الفيزيائيين الجارية في الجامعات ومراكز البحوث المختلفة والتي يطمح الفيزيائيون من خلالها أن يوحدوا جهودهم من أجل بحث أعمق وتواصل مثمر لبناء جيل من الباحثين المتميزين

على مستوى الوطن، ومن ثم يمتد هذا العطاء وهذا التواصل لزملائنا
الفيزيائيين في الخليج والبلدان العربية والإسلامية بإذن الله تعالى.

فباسم جميع الفيزيائيين نشكر جامعة أم القرى على هذه الاستضافة
الكريمة وما سبقها، وأتمنى للجميع التوفيق.

رئيس مجلس إدارة الجمعية
العلمية السعودية للعلوم الفيزيائية
د. علي الحجري

أعضاء اللجنة العلمية

م	الاسم	الصفة
١	أ.د. عبدالعزيز محمد صديق قطب.	جامعة أم القرى فيزياء الحالة الصلبة التجريبية (رئيساً) .
٢	أ.د. محمد سامي المنهراوي	جامعة أم القرى الفيزياء الإشعاعية الطبية.
٣	د. أحمد العرابي	جامعة أم القرى الفيزياء الإلكترونية.
٤	د. عبد بن محمد حمدان قاسم.	جامعة أم القرى فيزياء الضوء.
٥	د. خالد عبدالواجد	جامعة أم القرى الفيزياء النووية والنظرية.
٦	أ.د. إسرار أحمد مختار	جامعة الملك عبدالعزيز الفيزياء النووية والنظرية.
٧	أ.د. خورشيد أحمد صديقي	جامعة الملك عبدالعزيز فيزياء الحالة الصلبة النظرية.
٨	أ.د. أظهر أحمد أنصاري	جامعة الملك عبدالعزيز الفيزياء الإلكترونية.
٩	د. إبراهيم حمدان اللحياني	جامعة الملك عبدالعزيز الفيزياء النظرية.
١٠	أ. فتحية قاري أشهد علي	جامعة أم القرى

أعضاء اللجنة المنظمة

١	د. **أسامة بن فضل البار.**	عميد معهد خادم الحرمين الشريفين لأبحاث الحج	رئيساً
٢	د. **محمد بن عمر بابطين**	وكيل كلية العلوم التطبيقية	نائباً للرئيس.
٣	د. **صبري أسعد أبو منصور**	رئيس قسم الفيزياء	عضواً
٤	أ.د. **عبدالعزيز محمد صديق قطب**	رئيس اللجنة العلمية للندوة	عضواً.
٥	د. **سمير بن سليمان نتو**	رئيس لجنة التنسيق والسكرتارية	عضواً
٦	د. **وليد بن جميل ألطف**	وكيل عمادة القبول والتسجيل رئيس لجنة الخدمات	عضواً
٧	أ. **محمد عبدالفتاح فقيه**	المشرف على لجنة التسجيل والقاعة	عضواً
٨	أ. **فاطمة محمود جان**	المشرفة على الفرع النسائي بالندوة	عضواً
٩	م. **خالد بن ثامر الثقفي**	منسق علاقات الضيوف	عضواً

ملخصات
المحاضرات المدعوة

المحاضرات المدعوة

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Bahaa Aldeen M. M. Moharram

Excitations and its Effects at Equilibrium and Under Compression in Finite Cold Nuclei.

Mahmoud Mar'i Hasan

Overview on Hydrogen Absorbing Materials – Structure, Microstructure and Physical properties

M. Bououdin, A. Al-Hajry

The Role of Physics in the Development of Advanced Nanotechnology in Saudi Arabia

Professor Munir H. Nayfeh

Ferroelectricity in Glassy Materials

Alaa-El-Din A. Bahgat

Study the Opto- thermal Mechanical properties by Interferometric Techniques

I.M.Fouda

"Experimental Overview On Characteristics of High Energy Nuclear Collisions In The Energy Range 2.1- 200 AGeV".

Abdel Salam

New Trends for Environmental Applications of Theoretical & Experimental Nuclear Physics Researches

Bahaa Eddin M. Moharram
University of Tanta- Eygpt

Abstract

Theory and experiment in physics are two faces of the sam oin of the applied physics. The present speech, we are in process ontains new trends in applications which arises from th ombination of two applied nuclear techniques- Neutron Activatio Analysis (NAA) and Solid State Nuclear Track Detector SSNTDs), some contributions in the present art have bee nentioned. The speech also refers to the great importance o tilizing the environment of Saudi Arabia, the safe territory, at th argest scale including its deserts, mountains, and water as a kind o ourism refreshment for medical treatment with the up-to-dat atural methods followed in the developed countries.

تجاهات جديدة فى تطبيقات بيئية لأبحاث الفيزياء النووية نظرية و تجريبية

د. بهاء الدين محمد محمد محرم
أستاذ الفيزياء. كلية الهندسة – جامعة طنطا

. التحليل بالتنشيط النيوترونى (تحليل القياسات الطيفية لأشعة جام
المنبعثة من النظائر المشعة).

. الكواشف البلاستيكية للكشف عن بعض الجسيمات النووية وتقدي
تركيز غاز الرادون ودراسة تأثير خصائص مصادره على مدى فعاليته.

. تطبيقات هى وليدة الجمع بين التقنيتين وهى أيضا ولودة.

. الاسهام فى مآثر هذا الفن الذى يعد من أهم المجالات البيئية السلمي
للعلوم النووية.

Excitations and its Effects at Equilibrium and Under Compression in Finite Cold Nuclei

Mahmoud Mar'i Hasan
Jordan University for Graduate Studies
Amman –Jordan

Abstract

Using a realistic effective baryon-baryon Hamiltonian, th
ground state properties of the doubly magic spherical nuclei hav
een investigated in the radially constrained Hartree-Foc
pproximation including the Δ degrees of freedom. The extent t
which the physical properties of these nuclei are affected by the Δ
xcitations under static compression have also been examined. W
ound that much of the increase in the nuclear energy generate
nder compression is used to create the massive Δ particles. Th
ingle particle energy levels are calculated and their behavior unde
ompression is also examined. An agreement is found between th
esults with this effective Hamiltonian and the phenomenologica
hell model for the low lying single particle spectra. The result
how also a softening the equation of state with the inclusion of th
's.

Overview on Hydrogen Absorbing Materials – Structure, Microstructure and Physical properties

M. Bououdin[1], A. Al-Hajry[2]

. Advanced Materials, School of Mechanical Materials an Manufacturing Engineering, University of Nottingham, Nottingham UK.

. Department of Physics, College of Science, King Khali University, Abha P.O.Box 9003, Saudi Arabia.

Abstract

Hydrogen is a promising renewable fuel for transportatio nd domestic applications. Many systems have been investigated i rder to improve the maximum hydrogen storage capacit reversible), high kinetics, moderate equilibrium pressure and/o ecomposition temperature and better cyclability. In this paper, eview of studies related to stability of Zr-based Laves phas ystems as well as in-situ neutron diffraction investigation, th inetics of TiFe, surface treatment of LaNi5 system, mechanicall lloyed Mg-based hydrides, and graphite nanofibers are reportec Moreover, mechanical alloying using hydrogen as a pre-alloyin lement in order to improve the mechanical and physical propertie via amorphisation, particle/grain refinement, etc) of materials articularly ZrRh and ZrPd systems will be discussed.

The Role of Physics in the Development of Advanced Nanotechnology in Saudi Arabi

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Abstract

The development of advanced technology in Saudi Arabia is omplex process, with the impetus having to come not only fron cientists but from other sectors of society as well, bot overnmental and private. In a world where globalization an ompetitiveness are the rule, progress requires that Saudi Arabi ind areas in which she significantly better than her competito ecause of a better trained work force, favorable natural resource r scientific and technological capabilities. In this talk, I wi ntroduce nanotechnology as one of these choices and discus anotechnology opportunities in the area of silicon in Saudi Arabi will discuss the driving forces in the nanoworld (intellectua cience, market, risk capital, and initiatives) and the fields o mpact (material, energy, medicine, biotech, electronics, an nformation technology). Finally, I will argue why physicists i audi Arabia are not only pivotal and the springboard for th ealization of technology development, but they should have th ey role in determining choices and implementing developme trategies.

دور الفيزياء في تطوير التكنولوجيا النانونية المتقدمة في المملكة العربية السعودية

أ. د. منير حسن نايفة

دائرة الفيزياء - جامعة الينوي في أربانا - شامبين

إربانا - الينوي - الولايات المتحدة

ملخص

إن تطوير التكنولوجيا المتقدمة هي عملية معقدة وتحتاج كل الجهو يس من العلماء وحسب بل من جميع قطاعات المجتمع الرسمية والخاص لشعبية. ففي عالم اليوم، العالم الذي تحكمه العولمة والمنافسة فإن أي نجا في التقدم العلمي التكنولوجي يشترط أولاً التعرف على النواحي التي يتميز به د ما على البلدان الأخرى سواء كان في قوة العمل أو الثروات الطبيعية أ قدرات العلمية التكنولوجية.

سأقدم في هذه الكلمة العلوم والتكنولوجيا النانونية كأحد الميادين تي هي في تقديري ميادين يمكن أن تتميز بها المملكة العربية السعودي سأقترح بعض الفرص المتاحة في المجال في حقل السليكون والمواد الرملي تي يمكن أن تشارك بها البلد على المستوى العالمي، كما وسأعرض عتقادي بأن الفيزيائيين في المملكة العربية السعودية هم العماد والزمبرك دافع في تحقيق التقدم العلمي التكنولوجي، بالإضافة لضرورة الاستفاد نهم كمفتاح هام في تحديد ورسم الاختيارات وفي تنفيذ الاستراتيجيات تطويرية.

Quantum Computing : New Frontiers

M. Suhail Zubairy
Texas A&M University – USA

Abstract

Abstract: Quantum computing and quantum informatic ave emerged as research areas at the frontiers of physics. I his talk we shall present the basic ideas concerning quantun omputing and their applications. Starting with a brief histor nd major achievements in quantum computing, we sha liscuss applications to quantum searching, quantum factorin nd quantum cryptography.

Ferroelectricity in Glassy Materials

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The possibility of preparing a pure glassy phase ferroelectri naterial of the composition Bi1.8Pb0.3Sr2Ca2Cu3–xKxOz (0. <x< 0.4) was explored and verified experimentally. Here w liscuss these results and include a simple model to explain th origin of the observed ferroelectricity in glassy material, which i based on the residual and microstresses developed within the glas network during the quenching of the glass melt. Further, we preser ome additional experimental results showing the effect of the glas ransition temperature on the disappearance of the observe erroelectricity.

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الفروكهربية في المواد الزجاجية

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قسم الفيزياء، كلية العلوم، جامعة الملك خالد

ملخص

تعتبر الفروكهربية في المواد الزجاجية من الموضوعات الجديدة في مجال يزياء الحالة الصلبة. وقد تم وضع أول تصور نظري فيزيائي لها عام ١٩٧٧م[١] لكن لم يتحقق إثباتها عمليا سوى عام ٢٠٠١م بمساهمة من مقدم هذ لحاضرة[٢-٤]. وقد تم تحقيق هذا الإثبات في عدة معامل عالمية (اليابان مويسرا، الصين...) في نشرات عالمية موثقة. تتمحور المحاضرة حول دراس فروكهربية في زجاج مصنع من أكسيد عناصر البيزموث والرصاص النحاس والمطعم بالبوتاسيوم. وسوف نوضح الأسس المعملية التي عن طريقه م التأكد من تلك الظاهرة في مواد زجاجية التركيب. هذا وقد تم التأك ن التركيب الزجاجي بتطبيق عدة طرق تجريبية منها: حيود الأشعة السيني الميكروسكوب الإلكتروني النافذ والماسح وحيود الأشعة الالكتروني التحليل التفاضلي الحراري. هذا وقد تم التأكد من ظاهرة الفروكهربي دراسة عدة طرق كهربية منها: ثابت العزل الكهربي وعروة التخلف كهربي وتغير الاستقطابية بواسطة شدة المجال الكهربي وتغير درج حرارة، هذا بالإضافة إلى دراسة التيار الكهروحرارى وتحقيق قانون كوري فروكهربية. ولقد تم كذلك وضع نموذج نظري يوضح سبب ظهور هذ ظاهرة عند درجات الحرارة تحت درجة حرارة تحول الزجاج حيث أعيدت ظاهرة لسبب الاجهادات المحلية داخل تركيبة الزجاج والناشئة من التبري سريع لمصهور الزجاج.

Study the Opto- thermal Mechanical properties by Interferometric Techniques

I.M.Fouda
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Abstract

Multiple-beam fizeau fringes and two-beam interferometri ethods are used to study the changes effects of optical parameter f polymeric fibers at different conditions.A stress-strain devic onjugated to multiple-beam fizeau fringes system or a two-bean ystem (Pluta)polarizing interference microscope are used t nvstigate the dynamical behaviour of opto-thermo-mechanica roperties at room temperature.The changes in the strain ar valuated to obtain different mechanical parameters.Also th btained results of optical parameters by interferometery are use o calculate different parameters.The changes in the molecula rientation are evaluated to obtain orientation factor 2(θ),f4(θ),f6(θ),<P2(cos θ),<P4(cos θ) and crystalline an morphous orientation functions Fc and Fa respectively.Also th umber of network chain per unit volume Nc. work per unit volum V, average work per chains W\ reduction in entropy ΔS, an ptical stress parameter are determined. In addition differen arameters are given, shrinkage factor, surface reflectivity, Th ross link density……etc.

Relationships between the mechanical and optical parameter re given.

The present study demonstrates changes in molecula eorientation factors and structural parameters due to differen ffects. Micro-interferograms and curves are given for illustrations.

"Experimental Overview On Characteristics of High Energy Nuclear Collisions In The Energy Range 2.1- 200 AGeV".

A. Abdel Salam

Cairo University-Faculty of Science
- Physics Department- Egypt.

Abstract

In this talk a general review of nucleus-nucleus

Collisions for incident energies in the range of 2.1-200 AGe
vill be presented. I will briefly discuss the division of thes
nteractions into Peripheral and Central collisions. The talk Insha
ALLAH will be cover such subjects as: total cross sectio
neasurements, characteristics of multiparticle productions, targe
nd projectile fragmentation and investigate the dependence of thi
henomena on the projectile energy as well as on the impac
arameter of the interactions.

In order to determine the temperature of the different emitte
ystems, the pseudorapidity of the different emitted particle
relativistic, fast and slow) will be discuss.

The data on the high energy particle production at backwar
ngles beyond simple nucleon- nucleon kinematic limits are briefl
eported with the different correlation between them and th
haracteristics of such backward emission.

I will discuss the criteria of Cairo University group to selec
he central events in the interactions between different nuclei.

A special data on direct e+ e- pair production in superheav
ollisions system (16O & 32S Projectiles at 200 AGeV) will b
iscuss.

All measurements are carried out by a uniform method in hig
ngular resolution emulsion track detectors (photoemulsions) at M
EL- Nadi high energy Laboratory- Cairo University- Faculty o
cience– Egypt.

ملخصـــات
المحاضـــرات الملقـــاة
(الجلســـــات)

الجلسة العلمية الأولى

الفيزياء النووية (١)

الثلاثاء ٢٠/١٠/١٤٢٦هـ الموافق ٢٢/١١/٢٠٠٥م

الساعة ٩:٠٠ ــ ١٠:٣٠

Statistical and Thermal Properties of ^{40}Ca

Bassam Shehadeh

Carbon-nucleus total reaction cross section using Helm's model.

I. Ahmad and Jamal H. Madani

Spallation neutrons: Applications and theory

Fathia Kari and Khaled Abdel-Waged

Improvements of ultra-relativistic quantum molecular dynamics model stimulated by spallation neutron data

Khaled Abdel-Waged

Analysis of elastic a-nucleus scattering data at 240 MeV

A.M. Hakmi, J.M Madani , and M.A. Alvi

Statistical and Thermal Properties of 40Ca

Bassam Shehadeh
Department of Physics, Al-Qasseem University
Burydah, Al-Qasseem 51411, K.S.A
James P. Vary
Department of Physics and Astronomy
Iowa State University, Ames, IA 50011, U.S.A

Abstract

We investigate the thermal response of ^{40}Ca within a recentl leveloped model able to treat all the nucleons as active in ver arge model spaces including pairing effects. The model is based o he canonical ensemble and incorporates a mean field potential.

The thermal and statistical properties of ^{40}Ca, excitatio nergy, heat capacity, entropy, free energy, root mean squar adius, and level lensityarepresentedforthethreedimensionharmonicoscillatorandWo ods-Saxonpotentials.

The resulting favorable comparisons with finite temperatur Hartree-Fock results indicate the methods we develop offer promise as a useful approximation to the statistical properties o nedium and heavy nuclei. The calculated level density with th Vood-Saxon potential agrees very well with the experimenta lata.

PACS numbers: 21.10.Ma, 21.10.Pc, 21.60.Cs, 21.60.n 24.10.Cn, 24.10.Pa

Carbon-nucleus total reaction cross section using Helm's model

I. Ahmad and Jamal H. Madani
Department of Physics, Faculty of Science,
King Abdulaziz University
Jeddah, Saudi Arabia

Abstract

We apply the Coulomb modified Glauber model to derive losed expression for the heavy-ion total reaction cross section i erms of NN scattering parameters and the Helm's model densit parameters of the two colliding nuclei under the assumption tha he radii of the two nuclei do not differ much. The expression i sed to calculate ^{12}C total reaction cross sections for several targe uclei in the energy range 10 - 1000 MeV/nucleon. A compariso with the available experimental data shows that the predictions o our expression agree with the available experimental data fairl vell.

Spallation neutrons: Applications and theory

Fathia Kari and Khaled Abdel-Waged

Umm Al-Qura University, Faculty of Applied Science, Physics Department, Makkah Unit 126, P.O. Box 7047, Saudi Arabia

Abstract

Spallation neutron sources for various applications exploit th hermal excitation of heavy nuclei with energetic GeV proton an ubsequent decay of these nuclei by evaporation of mainly neutron vith energies of a few MeV. As a result of a continuous progress i ccelerator technology, the construction of a powerful spallatio ources has now become possible, providing new opportunities fo olid state physics, life and material science. A variety of project ave been initiated recently in the USA, Europe and Japan. In thi vork a brief account on the application of the neutron productio s given. In addition, the most popular microscopic transpo nodels applied for spallation reactions at intermediate energies ar riefly reported. Finally, we discuss in details one specifi nicroscopic transport model; the ultra-relativistic quantu nolecular dynamics model.

نيترونات التشظي: التطبيق والنظرية

فتحية قاري وخالد عبد الواجد

قسم الفيزياء- كلية العلوم التطبيقيه- جامعة أم القرى- ص.ب. ٧٠٤٧

سيتم في هذا العمل عرض التطبيقات العملية لنيترونات التشظي
كذلك نماذج المحاكاة المستخدمه لتفسير ظاهرة نيترونات التشظي. وأخير
يان كيفية تطبيق نموذج حركة الجزيئ الكمي الحديث عند الطاقات
لتوسطة.

Improvements of ultra-relativistic quantum molecular dynamics model stimulated by spallation neutron data

Khaled Abdel-Waged

Umm Al-Qura University, Faculty of Applied Science, Physics Department, Makkah Unit 126, P.O. Box 7047, Saudi Arabia

Abstract

The ultra-relativistic quantum molecular dynamics (UrQMD model is developed for neutron spallation production from ≈ 1 GeV proton induced reactions. Improvements in the dynamical conten of the standard UrQMD model are presented. In conjunction wit the generalized evaporation model, the "improved" UrQMD mode will be confronted with the whole energy-angle neutron doubl differential cross sections in the interactions of proton on Al, F and Zr at 1.2 GeV.

تطوير نموذج حركة الجزئ الكمي

المستوحى من البيانات العمليه لنيترونات التشظي

د. خالد عبد الواجد

قسم الفيزياء- كلية العلوم التطبيقيه- جامعة أم القرى- ص.ب. ٧٠٤٧

سيتم في هذا العمل عرض التحسينات التي أجريت على نموذج حرك
جزئ الكمي بهدف فهم البيانات العمليه لنيترونات التشظي. وسيستخد
ذا النموذج المحسن بعد دمجه بنموذج التبخير العام في حساب المقاط
عرضيه التفاضليه المزدوجه لتفاعلات البروتون مع أنوية الألومنيوم والحدي
الزوركونيوم عند طاقه 1.2 جيجا الكترون فولت ومقارنتها بالبيانات
عمليه.

Analysis of elastic a-nucleus scattering data at 240 MeV

A.M. Hakmi, J.M Madani* , and M.A. Alvi*
Department of physics, Science Faculty, UQU, Makkah
***Department of physics, Science Faculty, KAAU.Jaddah**

Abstract

Working within the framework of Coulomb modified Glaube nodel, we fit the elastic differential scattering cross-section of 24 MeV alpha particle on 58Ni using the effective N- α amplitude.

The realistic nuclear form factors parameterized as a sum o Gaussians have been used in the calculations. It is found that onc he ettective amplitude is calibrated on58Ni for 240 MeV alph particle scattering by varying the two parameters β2 and λ., it ver nicely reproduces the available elastic α scattering data on othe nuclei at the same energy.

الجلسة العلمية الثانية

الفيزياء النووية (٢)

الثلاثاء ٢٠/١٠/١٤٢٦هـ الموافق ٢٢/١١/٢٠٠٥م

الساعة ١١:٠٠ ـــ ١٢:٣٠

^{95}Tc : A rotational nucleus with intermediate deformation & (Systematics in odd –A Tc nuclei)

Sadek Zeghib

Simulation of Fast Neutrons Transmission Through Wood and Soil Samples

M. S. Abdelmonem, A. A. Naqvi, Hanan Al-Ghamdi and Ghada Al-Misned

Neutron activation analysis facility at KFUPM

Abdulkadir Aksoy

Some Studies On The Effect Of Motorway Traffic Emissions On Roadside Wild-Plants In Saudi Arabia

W. J. Altaf

^{95}Tc : A rotational nucleus with intermediate deformation & (Systematics in odd –A Tc nuclei)

Sadek Zeghib
King Khaled University, College of Science.
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P.O.B. 9004, Abha, Kingdom of Saudi Arabia

Abstract

The nature of collective motion in transitional nuclei has bee
he subject of extensive investigation over the past three decades. I
as been demonstrated [1,2,3,4,5] that many features of transitiona
uclei, particularly those in the mass 100-region, can be understoo
n the framework of a standard symmetric particle-rotor if th
Coriolis interaction is properly treated. One serious obstacle to th
cceptance of this interpretation has been that the phenomena i
ransitional nuclei identified as rotational are not the well-know
otational bands of the strongly deformed region. However th
ecognition of rotational features can be obscured because th
Coriolis interaction, which is an integral part of rotational model
an distort the familiar pattern of rotational bands. 95Tc has a
ntermediate deformation and the evidence will be presented fo
our rotational bands typical of more strongly deformed nuclei a
vell as for features claimed to be rotational in less deformed nucle
t will be shown again as in previous work [3,4,5], that both kind
f phenomena identify rotational motion in the same nucleus an
liffer only in the role of Coriolis interaction. It has been shown tha
here is no consistent band structure for the positive parity states fo
vhich g9/2 parentage is deduced in all these nuclei . These state
xhibit a more or less large degree of Coriolis mixing but not larg

nough to drive them to the multiplet limit. It will be shown that th hift toward the multiplet limit occurs in 95Tc which shows tructure similar to 111Ag [2].

An extensive set of low spin states in ^{95}Tc has been identifie rom the different work listed in Ref. [6]. These include (p,nγ) γ,2nγ), (p, γ) reactions and (95Ruγγ Decay). The present work wil e based mainly on these available data.

Our recent papers [3,4,5] on Tc nuclei presented evidence tha 97Tc, 99Tc and 101Tc are clearly rotational. It has been shown tha 93Tc (with 50 neutrons) appears to be spherical while 101Tc [5 with 58 neutrons) has been shown to be deformed. This pape eports our model calculation (using a particle-rotor model) fo 95Tc in order to complete the investigation on Tc nuclei. Th ransition in Tc nuclei from deformed to spherical can be treate imply as a change in deformation.

In this regard a systematic study of the changes in propertie of odd-A Tc nuclei as a function of the change in deformation i given starting from 93Tc (spherical nucleus) to 105Tc (deforme ucleus) .

Simulation of Fast Neutrons Transmission Through Wood and Soil Samples

M. S. Abdelmonem(1)-, A. A. Naqvi(1)*, Hanan Al-Ghamdi(2) and Ghada Al-Misned(2)

1) Department of Physics, King Fahd University of Petroleum and Minerals, Dhahrn, Saudi Arabi
2) Girls Education College, Riyadh Girls Colleges, Riyadh, Saudi Arabia

Abstract

Fast neutrons transmission measurements are ideally suite or elemental analysis of bulk samples. Particularly they can b sed to determine the hydrogen concentration in the bulk samples he loss in fast neutron intensity transmitted trough the bul amples is attributed to inelastic scattering of fast neutrons fron ydrogen atoms present in the sample. In the present study Mont Carlo simulations have been carried out to estimate the intensity o at neutrons.

The simulated setup consists of cylindrical wood and soi amples, which were placed at a distance of 9cm from the neutron ource. The fast neutrons transmitted through the sample ar ollimated through a neutron collimator to a fast neutron detecto 125mm x 50mm (diameter x thickness)] located at distance o 26.56cm from the sample. The collimator, which is doubl runcated, is 145cm long. It contains a mixture of paraffin an ithium carbonate.

The wood and soil samples contained water in variou oncentrations. The calculated intensity of fast neutrons transmitte

hrough the wood and soil samples not only shows neutron ttenuation effects due to water concentration of the samples bu lso due to elemental composition of the samples. This is clearl hown through different values of slope of neutron attenuatio urve for wood and soil samples. Results of the study will b resented in this talk.

Neutron activation analysis facility at KFUPM

Abdulkadir Aksoy

Physics Dept., KFUPM, Dhahran

Abstract

Neutron Activation Analysis (NAA) is a direct non lestructive elemental analysis technique. It is a bulk analysis whic llows the whole volume of sample to be probed. It is multi lemental allowing simultaneous determination of multipl lements. The NAA is independent of the chemical composition o he matrix. It provides rapid and sensitive analysis (of ppm to wt% ange).

The NAA facility at KFUPM provides 14 MeV neutron vhich could be used to activate fast neutron reactions. Utilizing th acility the sensitivities of 42 elements were determined. Th acility has been used in activation of various industrial sample uch as catalysts, lubricant oils crude oil, etc. The results wer atisfactory. The technique could be used as an complementar nalytical tool for elemental characterization.

The NAA technique will be summarized. The KFUPM NA acility will be described. Results of various analysis using th acility will be presented and the importance of this application fo ocal industry will be discussed.

SOME STUDIES ON THE EFFECT OF MOTORWAY TRAFFIC EMISSIONS ON ROADSIDE WILD-PLANTS IN SAUDI ARABIA

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waltaf@uqu.edu.sa

Abstract

The levels of several composite elements of two wild plants amely Euphorbia terracina and Calotropis procera were evaluated hese plant species are quite abundant all year round in the Makka rovince of Saudi Arabia. Leaves from the above plants wer ollected at 5km intervals from the sides of two stretches, 5 ilometres each, of two motorways between the cities of Makka nd Taif. One of the motorways (Ahada motorway) is dominated b etrol fuelled passenger and light goods vehicles whereas the othe notorway (Assail motorway) has a significant number of diese uelled heavy goods vehicles.. Instrumental neutron activatio nalysis (INAA) was employed with different irradiation an ounting conditions. The suitability of the two wild plant species a otanical environmental monitors was investigated and the effect f the different vehicular emissions on the concentration levels o 5 elements is discussed. Control samples from a rural environmen vere also collected and analysed in order to provide baseline level f the elemental concentrations.

بعض دراسات تأثير الإنبعاثات المرورية في الطرق السريعة على النباتات البرية المتواجدة على جوانب الطرق في المملكة العربية السعودية

د. وليد جميل الطف

قسم الفيزياء، جامعة أم القرى.

تم تقدير مستويات العناصر المكونة للنباتين البريين المعروفين بالحرمل
العشار الواسعين الانتشار والمتواجدين بوفرة على مدار العام في منطقة مك
لكرمة. تم جمع الأوراق من النباتين على عى طول ٥٠ كم من طريق مك
طائف السريع (الهدا) وطريق مكة الطائف السريع (السيل) وعلى مسافات
بنية تقدر بخمسة كيلومترات. ومن المعروف أن معظم المركبات التي تسي
لى طريق مكة- الهدا تستخدم وقود البنزين ، في حين أن هناك عد
كبير من المركبات على طريق مكة - السيل تستخدم الديزل كوقو
حيث تمثل الشاحنات نسبة كبيرة من المركبات المستخدمة لهذا الطريق. ت
ستخدام الطريقة الآلية في تحليل الحث الإشعاعي بالنيوترونات عند ظروف
شعيع وعد مختلفة. وتم دراسة كل من النباتين البريين كمؤشر للبيئة التي
مثلانها. وتم تحليل دراسة تأثير ما تبثه المركبات من عناصر في البيئة على
راكيز ١٥ عنصرا فى النباتات المعرضة لتلوث المركبات. وتم كذلك ايجا
راكيز نفس العناصر لعينات عيارية جمعت من مناطق نائية وبعيدة ع
صادر التلوث وذلك لإيجاد قيم تراكيز العناصر بها ومقارنتها مع تلك
نباتات المتعرضة.

الجلسة العلمية الثالثة

فيزياء الجوامد (١)

الثلاثاء ٢٠/١٠/١٤٢٦هـ الموافق ٢٢/١١/٢٠٠٥م

الساعة ١:٠٠ ــ ٢:٣٠

Some studies on gamma- irradiated sodium tetraborate glasses containing ytterbium

A. A. Kutub, M. S. Elmanharawy, M. O. Babteen

Electrical, Structural, Magnetic and Transport properties of Zn_2 Ba Fe_{16} O^{27} doped with Cu^{2+}

O. M. Hmeda(a), M . El- Saadawy(b) , A. Al-Sharif(c), and A. Tawfik(a)

Synthesis and properties of Nanostructured Zinc oxide

Nouar Amor Tabet

Renormalized field theory of the crossover effect on the susceptibility amplitude ratio near uniaxial dipolar ferromagnets

Ibraheem Nasser, Afaf Abdel-Hady

Temperature Dependent electrical characteristics of metal contacts to Al-Gan films

M. S. Al-Ahmadi, Farag S. Al-Hazmi, Haya Abdullah Al-Humiany, Alaa Yahay Emam Mahmoud and Azhar A. Ansari

دراسة عن تـأثير. أشعة جاما. على المركب الزجاجي
رباعي بورات الصوديوم المحتوي على عنصر اليتربيوم

أ. د. عبد العزيز محمد صديق قطب. أ. د. محمد سامي المنهراوي. د. محمد عمر
بابطين قسم الفيزياء – كلية العلوم التطبيقية. جامعة أم القرى. مكة المكرمه

Some studies on gamma- irradiated sodium tetraborate glasses containing ytterbium

A.A. KUTUB, M.S.ELMANHARAWY , M.O. BABTEEN
Department of Physics, Faculty of Applied Sciences, Umm Al-Qura University, Makkah, Saudi Arabia.

تناولت هـذه الدراسـة الإمتصاص الـضوئي وطيـف الإمتصاص للأشع
حت الحمراء والمسح التفاضلي الحراري DSC لأنظمة المركبات الزجاجي
(Yb_2O_3) ($Na_2B_4O_7$)$_{100-x}$ كدالة في نسبة إحتوائها على العنص
لأرضي اليتربيوم (Yb) من صفر حتى ٥٪ . ثم تم تعريض هذه المركبات
أشعة جاما من وحدة الكوبلت- ٦٠ – بمعدل جرعة قدرها ٨,١
حراى/ساعة لمدة ٧٠ و ١١٠ ساعة ، حيث قيست أطياف الإمتصاص قبل وبعـ
عملية التشعيع لمدى الطول الموجي من ١٩٠ الى ٣١٥٠ نانومتر، وقورنت بأطياف
تركيب الزجاجي الأساسي لرباعي بورات الصوديوم ($Na_2B_4O_7$) . وقـ
ساعدت هذه القياسات على تفهم تأثير العنصر الأرضي اليتربيوم (Yb) علـ
كوين المراكز اللونية للجرعات المنخفضة والعالية من أشعة جاما.

A series of glass samples of (Na_2 B4 O_7)100-x – (Yb_2 O
x were prepared by the usual melt quenching technique where
aried from 0 to 5 mol% . Optical absorption spectra wer
neasured before and after gamma- irradiation of the glasses
Gamma-irradiation causes a shift of the fundamental absorptio
dge to longer wavelengths and induces a new absorption ban
round 550 nm for all glass compositions. The position of thi
and remains unaltered by increase in either the Yb_2O_3 content o
he gamma-dose. A second band at 360 nm only appears for glasse
loped with Yb2O3; its position remains unaffected by a storag
ime of 2500 h. The radio-thermoluminescence (RTL) curve for th
ase glass (Na_2 B_4O_7) shows two peaks around 90 oC and 20
C. The inclusion of Yb_2O_3 in the base glass causes a gradua
uppression of the low temperature peak with increasing Yb_2O
oncentration. At 4 mol% Yb_2O_3, it disappears and the RTL curv
ubsumes a single well-defined peak at high temperatures. Th
TL peaks tend to shift to higher temperatures with increase in Y
nclusions.

Electrical, Structural, Magnetic and Transport properties of Zn_2 Ba Fe^{16} O^{27} doped with Cu^{2+}

O. M. Hmeda(a), M . El- Saadawy(b) , A. Al-Sharif(c), and A. Tawfik(a)

a) Physics Department, Faculty of Science, Tanta University Tanta, Egypt .

b) Physics Department, Faculty of Education, Tant University, Kafr El-Sheikh,

c) Physics Department, Faculty of Science, Moata University Jordan .

Abstract

Series of polycrystalline samples of Zn_2-x Cux Ba Fe^{16} O^2 were prepared by usual ceramic methods, where (x=0.0, 0.4, 0.6 .8, 1.0, 1.4) . X-ray analysis were obtained at room temperatur sing Cok_α with $\lambda = 1.790 A^0$ confirms the presence of W-typ exaferrite phase structure. Saturation magnetization and hysteresi oops curves measurements at room temperature were studied as unction of Cu^{2+} substitution . It can be seen that the Cu^{2+} conten lightly decreases the saturation magnetization from 25 to 2 emug-1), all hysteresis loops are closed which indicates lov nisotropy field and low saturation magnetization field . The d onductivity and thermoelectric power was measured in range fron oom temperature up to T = 750 K for all samples. Th hermoelectric coefficient decreases by increasing Cu^{2+} content an he conductivity increases with temperature. The value of th harge carrier concentration increases by increasing temperatur nd Cu^{2+} content .

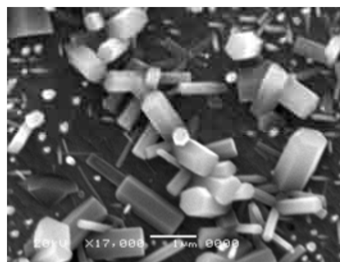
Key words : Magnetic properties, Electrical properties, charg arrier concentration X-ray analysis , Hexagonal ferrite .

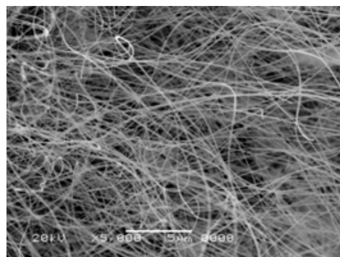
Synthesis and properties of Nanostructured Zinc oxide

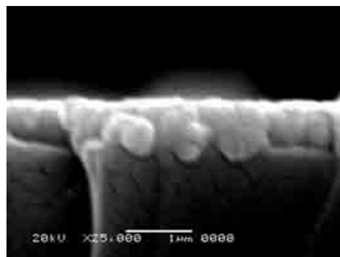
Nouar Amor Tabet
Surface Science Laboratory, Physics Department, King Fahd University of Petroleum and Minerals, Saudi Arabia,
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Abstract

Zinc Oxide has a wide range of applications owing to it piezoelectric and semiconducting properties. It is used as a ga ensor, photocatalyst, antireflecting oating, transparent electrodes in solar ells and flat panel displays, varistors to prevent voltage surges, UV filter in unscreens,.. In optoelectronics, zinc oxide is currently considered as a erious candidate to replace GaN for the abrication of UV and blue Light Emitting diodes. The large binding nergy of the exciton could allow the lesign of laser diodes above room emperature. However, obtaining p-ype conductivity has been a major bstacle for the development of such pplications. In the last two years, few uccessful attempts have been reported, uelling a substantial renewal of nterest for this material. The paper liscusses the properties and various anostructured zinc oxide materials that ve have synthesized using various echniques. These include nanopowders,







anocrystals and thin films obtained by vapor-condensation technique oxidation of pure zinc substrates and magnetron reactive Plasm espectively. Potential applications of each of these nanomaterial vill be discussed.

igure : a) ZnO nanocrystals on (001) Pt substrate, b) ZnC Nanofibers, c) ZnO thin film

cknowledgments

he author would like to thank King Fahd University of Petroleur nd Minerals for its support.

Renormalized field theory of the crossover effect on the susceptibility amplitude ratio near uniaxial dipolar ferromagnets

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[a]Physics Department, King Fahd University of Petroleum and Minerals, Dhahran 31261, Saudi Arabia.
[b]KFUPM, P. O. Box 1991, Dhahran 31261, Saudi Arabia.

Abstract

The susceptibility amplitude ratio with strong uniaxial dipola s calculated in the frame of the renormalization group theory an Gaussian model. The crossover behavior of the calculated ratio t sing is discussed in terms of the crossover parameters. A omparison between our calculations and the available theoretica nd experimental results is presented.

Temperature Dependent electrical characteristics of metal contacts to Al-Gan films

M. S. Al-Ahmadi, Farag S. Al-Hazmi, Haya Abdullah Al-Humiany, Alaa Yahay Emam Mahmoud and Azhar A. Ansari
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King Abdulaziz University P.O Box. 80203. Jeddah 21589. K.S.A

Abstract

Nickel-Gold Schottky contacts to MOCVD grown AlGaN ilms have been studied by the I-V-T method. The geometry of th levices studied was NiAu / Sapphire substrate. The range o emperature over which the electrical characteristics were studie aried from 77K to 450K. It was determined from the forwar haracteristics that the value of the ideality factor increases wit lecreasing temperature. This is seen to be a consequence of th lecreasing component of the thermo ionic current with decreasin emperature. A fact supported by a corresponding reduction of th Schottky barrier height with temperature. The reverse current is unction of temperature and does not saturate with voltage. Thi behavior has been attributed to a Poole-Frenkel type process wher lonor type centers, present in the u.i.d AlGaN layer, ioniz hermally over a field lowered barrier.

الجلسة العلمية الرابعة

فيزياء الجوامد (٢)

الأربعاء ٢١/١٠/١٤٢٦هـ الموافق ٢٣/١١/٢٠٠٥م

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A Group Theoretical Approach to f Electrons in Icosahedral Symmetry.

Khursheed A. Siddiqui

Angular Distribution of Charge and Spin Density of 4f Electrons in the presence of a Crystal Field

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Size Effect on Curie temperature of Fe Thin Films in Fe/Ir Superlattices.

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Lattice dynamic properties of $Al_xIn_{1-x}Sb$

Nadir Bouarissa

Title Indentation-induced Structural Phase Transformations in Silicon Crystals.

Maha M. O. Khayyat

A Group Theoretical Approach to f Electrons in Icosahedral Symmetry

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Abstract

The correspondence beween seven f orbitals and th omponents of the irreducible representations of the icosahedra group is generalized. An analytical treatment of strong crystal fiel by using the unitary group is given.

Angular Distribution of Charge and Spin Density of 4f Electrons in the presence of a Crystal Field

A. F. A. Alhaj[a] and K. Ayuel[b]

Abstract

Probability and spin density of rare earth tri-positive ions i heir ground states are calculated for both free ions and ion ubjected to crystal fields (cubic symmetry) using the Steven perator equivalents formalism which enables a multiple expansio f charge and spin densities in spherical harmonics. For axia ymmetry, the graphical representation reveals features lost i onsidering only the sign of the electrostatic quadruple moment nd the localization of the 4f electron density may be correlate vith the variation of M_J (M_J = -J ….J) according to the steven nultiplicative factor θ_J while in cubic symmetry the angula listribution of charge density consists in several lobes due to th nixing of $|JM_J\rangle$ states of the save functions. In axial symmetry th pin density is generally not collinear except for the fully aligne tates $M_J = \pm J$.

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Size Effect on Curie temperature of Fe Thin Films in Fe/Ir Superlattices

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Abstract

In ferromagnetic thin films, the Curie temperature variatio vith the thickness is always considered as continuous when th hickness is varied from n to n + 1 atomic planes. We show that it i ıot the case for Fe in Fe/Ir superlattices. For an integer number o tomic planes, a unique magnetic transition is observed b usceptibility measurements, whereas two magnetic transitions ar bserved for fractional numbers of planes. This behavior i ttributed to successive transitions of areas with n and n+ 1 atomi lane, for which the Tc's are not the same. Indeed, the magneti orrelation length is presumably shorter than the average size of th erraces. Monte Carlo simulations are performed to support thi xplanation.

ملخص

من المعروف أن درجة حرارة كيري (Curie) T_C تتغير تغيرا مستمرا ـ
لأفلام الرقيقة المغناطيسية إذا تغير السمك من n إلي $n+1$ مستوي ذري. مـ
خلال هذه الدراسة التجريبية و النظرية للقابلية المغناطيسية للحديد ـ
شبيكات الفائقة Fe/Ir أثبتنا أن هذه الفرضية غير صحيحة دائما. فبالنسب
عدد طبيعي من مستويات الحديد نجد درجة حرارة انتقالية واحدة للعينة TC
ما العينات التي بها عدد من المستويات غير مكتمل فإننا نلاحظ وجود درجتي
حرارة T_{C1} و T_{C2}. شرح هذه الظاهرة يعود إلي أن العينة تكون متكونة مـ
نطقتين إحداهما فيها n مستوي ذري من الحديد لها درجة حرارة T_{C1}
الأخرى بها $n+1$ مستوي ذري لها درجة حرارة T_{C2}. المحاكات التي أجريت
واسطة طريقة مونت كارلو(Monte Carlo simulations) أثبتت هذ
نتائج.

Lattice dynamic properties of $Al_xIn_{1-x}Sb$

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Abstract

We present a theoretical investigation of lattice dynami roperties namely, the elastic constants, the sound wave velocitie ropagating in different crystallographic directions and th ongitudinal and transversal optical phonon frequencies fo $Al_xIn_{1-x}Sb$ semi-conducting alloys in the zinc-blende structure. Th tudy is based on the pseudopotential scheme under the virtua rystal approximation combined with the Harrison bond orbita nodel. A particular attention is devoted to the effect o ompositional disorder. For this purpose, a correction to the allo otential is introduced. Detailed comparisons are made with th vailable measured values and with results obtained in previou heoretical studies. The agreement between our results and thos eported in the literature is found to be satisfactory. Th nformation derived from the present study may be useful for th levelopment of opto-electronic devices that operate in the mid nfrared spectral range.

Title Indentation-induced Structural Phase Transformations in Silicon Crystals

Maha M. O. Khayyat

Abstract

Abstract Structural phase transitions in single crystals o ilicon (c-Si) has been investigated for indentation made at roon emperature, using two main techniques (1) in-situ electrica haracterisations (2) and ex-situ Raman spectroscopy. Th lectrical characterisations between the two metal pads, with th ndentation straddling the gap between the two pads showed that c i transforms to a more conductive phase, consistent with the viev hat during indentation the face-centred cubic phase (Si-I ransforms to the Si-II phase which has a crystal structure similar t hat of β-Sn (body-centred tetragonal). The measurements wer nade using two- and four-contacts techniques. Both technique howed that the measured resistance decreases during loading owever, four-contact measurements proved that there is indeec

phase transition to a more conductive phase, by eliminating th
ffect of the contact in the measured resistance. The Raman spectr
rom recovered indentations showed that Si-I transforms to a body
entred cubic structure (Si-III), as indicated by the existence o
Raman peaks corresponding to this phase.

الجلسة العلمية الخامسة

الموصلية الفائقة

الأربعاء ٢١/١٠/١٤٢٦هـ الموافق ٢٣/١١/٢٠٠٥م

الساعة ١١:٠٠ ــ ١٢:٣٠

Flux Jumps in Magnetization of YBCO Tubes

Nasser S. Alzayed

Thermoelectric power, Electrical conductivity and Magnetoresistence of $Ga_{0.45}In_{0.55}Sb$.

M. M. Ibrahiem, M. M. Abd El-Raheem* and M. R. Ahmed

Flux Pinning and activation energy in Polycrystalline BiSrCaCuC (2223) superconductor

Abdullah A. El Abbar

Structural and Superconductivity in Y-doped Bi (Pb): 2223 Superconducting System

A.Sedky

Electron and positron scattering in solids: Monte Carlo calculations

Nadir Bouarissa

Flux Jumps in Magnetization of YBCO Tubes

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Abstract

We investigated cylindrical magnetic shields made fron olycrystalline YBa2Cu3O7-x , a well known High Temperatur uperconducting Material (HTS) under a range of externall pplied magnetic fields and measured at 77 K. Magnetization, i articular, was studied intensively and found some flux jump appened in the magnetization cycle. Using sensitive flux-gat neter we could detect jumps at small applied magnetic fields (orde f 1 mT). Similar jumps were reported by others for other HT naterials and for other shapes like disks and rings but for hig alues of applied magnetic fields. Those observed jumps wer ystematic and happened at same points for many tube Consequently, we believe that models based on statistical therma nstability, low specific heat of HTS or magnetic flux avalanch pproaches are insufficient to explain for this phenomenon. We tr ere to introduce a different way to explain for the occurrence o umps in High TC Superconductors.

قفزات في الفيض المغناطيسي أثناء دورة التمغنط لأنابيب فائقة التوصيل مصنوعة من أكسيد كربونات الإيتريوم والباريوم YBCO

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ملخص

لقد تم إجراء بحث على الأنابيب فائقة التوصيل والمصنوعة مـ ركبات أكسيد كربونات الإيتريوم باريوم YBCO متعددة التبلور والتي تـ راؤها من تشيكوسلوفاكيا، حيث تمت دراسة تمغنط تلك الأنابيب تحـ رجات حرارة النيتروجين المسال 77 k وذلك تحت تأثير مجالات مغناطيسي تغيرة. وقد لوحظ أنه توجد في الدورة الكاملة للتمغنط قفزات في الفيض لغناطيسي تتكرر في مواقع معينة. وقم تم استخدام مجس مجال مغناطيسي حساس جدا بحيث يمكن قياس مجالات في مدى 1 mT (١ ميللي تسلا) قد تم نشر بحوث كثيرة حول قفزات مغناطيسية مشابهة حصلت مع أشكال خرى مثل الأقراص فائقة التوصيل وغيرها، ولكن فقط عند مجالات غناطيسية خارجية كبيرة جدا. وفي بحثنا هذا فقد لاحظنا حصولها بصور تكررة ومنتظمة ومع جميع الأنابيب التي تمت دراستها. وبسبب هذا الانتظا إننا نعتقد بأن النماذج الرياضية التي استخدمت لشرح الظاهرة في حال لجالات العالية لا تنطبق في هذه الحالة. إن تلك النماذج تعتمد على فكر حصول الانهيارات المغناطيسية بصورة إحصائية عشوائية بسبب الضغوط لغناطيسية الهائلة أو على حقيقة كون الحرارة النوعية لهذه المواد منخفضة ما يسبب ارتفاعات حرارية محلية، تفقد الموصل لموصليته الفائقة محليا مم ؤدي إلى القفزة في الفيض المغناطيسي. في اعتقادنا أن الظاهرة كمية تخضع لظروف متكررة وتتضح أكثر كلما كان المجال المغناطيسي أقل.

Thermoelectric power, Electrical conductivity and Magnetoresistence of $Ga_{0.45}In_{0.55}Sb$.

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Abstract

The thermoelectric power and Hall measurement carried ou
n the as-prepared sample of $Ga_{0.45}$ $In_{0.55}$ Sb confirmed that th
ample is n-type semiconductor. The existence of two minima a
.5 and 4.8 Vcm-1 on the σ - E characteristic reflects th
ccurrence of the Gunn effect. A metallic like behavior of th
ample is observed and interpreted. The variation of the mobility
vith temperature T showed a unified value of the separatio
emperature Tr at 263K at all the values applied for the magneti
ield. The effect of the magnetic field on the concentration of th
lectrons is apparent. The effect of the magnetic field and th
mbient temperature on the Magnetoresistence seemed mutual.

Flux Pinning and activation energy in Polycrystalline BiSrCaCuO (2223) superconductor

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Abstract

AC-susceptibility measurements were performed o olycrystalline BSCCO (2223) superconductor to investigate th ole of granulariy in determining the flux-line pinning an ctivation energies. The two components of the ac susceptibilit he real (χ") and imaginary (χ") parts as functions of temperatur he amplitude and frequency of the applied ac-magnetic field wer neasured simultaneously using a conventional mutual inductanc echnique. Since ine out of phase component (χ") is related t lissipation, this component can be used to investigate vorte lynamics and flux-line pinning especially in high-T uperconductors where dissipation has a pronounced effec Jnderstanding the nature of pinning mechanisms in the high-T

uperconductors is very important in order to improve the curren arrying capability in tnese materials.

It is shown here that the ac response is characterized b ntrinsic or intragranular and coupling or intergranular contribution vith different pinning mechanism. There is a strong correlatio etween the depinning line H(TP) and the field dependence of th ctivation energy. This correlation along with the frequenc lependence of the ac susceptibility indicates the importance of th hermally activated processes such as flux creep in this high-T naterial.

Structural and Superconductivity in Y-doped Bi (Pb): 2223 Superconducting System

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Abstract

The effect of Y doping on the superconductivity i Bi1.7Pb0.3Sr2Ca2-xYxCu3Oy samples has been investigated by x ay diffraction, resistivity and thermoelectric power measurements Y was incorporated in the Ca site with x ranging from 0.00 to 0.50 From XRD data, it is observed that the volume percentage of th 2223 high Tc phase decreases with increasing Y content. It is also found that the replacement of the Ca^{2+} ion by Y3+ ion does no nfluence the tetragonal structure of the pure Bi (Pb):2223 system nd the lattice parameters vary with Y content. The critica emperatures, determined from resistivity data, show a depression n its values as the substitution content increases. Our result uggest that Y, compared with other rare-earth elements, has higher solubility in Bi (Pb):2223 system and is more detrimental t he superconductivity. The possible reasons for the suppression i he superconductivity of the studied system are presented.

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Electron and positron scattering in solids: Monte Carlo calculations

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Abstract

Monte Carlo simulation of slow electrons and positron ackscattering form semi-infinite solids with normal and obliqu ngles of incidence is reported. We present results for th ackscattering coefficients, mean penetration depths and stoppin rofiles. The dependence of the backscattering coefficient on th naterial, on the projectile primary energy and on the incidenc ngle has been examined and discussed. Our simulated results an he available experimental data are found to be in reasonabl greement. A simple scaling relationship which reduced th topping profiles onto a single universal curve for such a studie naterial is proposed with only two fitting parameters instead o our parameters previously reported in the literature.

الجلسة العلمية السادسة

الفيزياء البيئية

الأربعاء ٢١/١٠/١٤٢٦هـ الموافق ٢٣/١١/٢٠٠٥م

الساعة ١:٠٠ ــ ٢:٣٠

Environmental Applications of Laser Induced Breakdown Spectroscopy: Analysis of Oil, Soil and Ore Waste Samples

M. A. Gondal, T. Hussain and Z. H. Yamani

Study of the incident UV irradiance on Muna area and its relation with the ground level NO, NO2 and O3 concentrations during hajj time

Abdulaziz R. Seroji

Average Surface Albedo Measurements in the UV, IR and TSR on the Holy Mosque and Places in Makkah, Saudi Arabia

Abdulaziz R. Seroji

Laser Based Sensor For Ozone Detection In The Environment.

M. A. Gondal , I. A. Bakhtiari and Z. H. Yamani

Solid State Dye Laser synthesized by gamma irradiation polymerization method.

Attieh A. Al-ghamdi, Abdullah .M Al-Enizi, Salim S. Al-Thieab, Eiman M. Mahroos, Majed S. Al-sayari

Environmental Applications of Laser Induced Breakdown Spectroscopy: Analysis of Oil, Soil and Ore Waste Samples

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Abstract

Information regarding the chemical composition of ubstance is of fundamental importance for numerous tasks durin rocess control and quality assurance in industrial productio ollution monitoring and environmental technology. Conventiona nethods for chemical analysis like atomic absorption an nductively Coupled Plasma (ICP) require a lot of time and effor or analysis due to lengthy sample preparation procedures. T vercome this time consuming and tedious task, a new techniqu nown as Laser Induced Breakdown Spectroscopy (LIBS) has bee ntroduced. LIBS is based on the focusing of a high-power pulse aser beam onto a sample surface leading to the creation of lasma composed of excited species which emit light. Collection o he plasma light, followed by spectral dispersion and detectio ermits identification of the elements present in the sample usin heir characteristic spectral lines and allows quantitative analysi This technique has been applied to samples for simultaneous multi lement analysis such as solids, liquids, gases, environmental an eological samples. The main advantages of LIBS techniqu nclude: stand-off analysis capability, no sample preparatio

equirements, rapid analysis, simultaneous multi-elementa letection (major, minor and trace elements), and the ability t neasure the composition of weathered layers and the underlyin oulk rock composition through depth profiling (repeated ablation).

A Laser induced breakdown spectrometer (LIBS) has bee leveloped at KFUPM for various applications in the field o nvironment, trace metal detection in solid waste, agriculture ,or nd oil residue sample analysis. The LIBS setup has been applie or quantitative measurements of environmentally vital trace metal uch as magnesium, lead, copper and calcium, chromiur admium, aluminum, in solid samples at atmospheric pressure. Th ystem has been tested for the analysis and detection of these trac lements in soil samples collected from green house fields, Arabia rude oil waste residue sample and for determination of iro ontents in ore samples collected from local mines. Limits o letection (LOD) of our LIBS system were also estimated for thes lements which is 14, 12, 6, 3.5, 5, 10, 11, 4 2 and 7 ppm fo Calcium, Iron, Magnesium, Copper, Zinc, Sodium, Nicke Potassium, Molybdenum and Lead, respectively.

Study of the incident UV irradiance on Muna area and its relation with the ground level NO NO2 and O3 concentrations during hajj time

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Abstract

Solar UV radiation has a potential effect in terms o tmospheric chemistry. This UV irradiance (radiation on a fla urface) can react with many primary pollutants such as nitroge xides (NO_x =NO +NO_2). These UV photochemical reactions ar eading to the secondary pollutants such as ozone (O_3) the ver oxic gas in the troposphere. Here we have measured the inciden JV irradiance on Muna area (holy place for pilgrimages) i Makkah in Saudi Arabia (412 m altitude, 21°.25 N, 39°.52 E luring hajj time from 6th of Ramadan until 18th (28/1 – 9/2/2004 The incident total UV irradiance on Muna was measured using proad bandwidth filter radiometer (The Eppley TUVR) that has th JV wavelengths range from 395 to 385 nm. This TUV vavelength range covers the most important UV regions UVB (28 315 nm) and UVA (315 – 400 nm). The highest recorded total U rradiance (39 W/m^2 at midday) was on clear sky condition i /2/2004. However, this value has diminished to about 33 W/m

nder partial cloud conditions on 9/2/2004. The dependence of th neasured total UV irradiance on solar zenith angle (SZA) has bee presented as well. The ground level concentration of NO, NO_2 an O_3 in Muna were also measured during the same period usin Mobile Pollutants Detection Station (MPDS) (UV Photometri Ozone Analysis for O_3 detection and Chemiluminescent NO Analysis for NO and NO_2 detection). The largest detecte oncentrations of NO, NO_2 and O_3 species were approximately 62 μg/m^3, 184 μg/m^3 and 87 μg/m^3 respectively. A linear regressio was applied to study the correlation levels between the intereste pollutants and the incident UV irradiance. The best correlation (R = 75%) was found at O_3 concentration, while it decreased to 68% s in term of NO_2 which confirms the existence of th photostationary state and implies the existence of additional NO ources in the atmosphere. The worst correlation (R_2 = 13%) wa bserved at NO case and this is because of the dominant source o NO on the ground is the combustion of fossil fuels. Nevertheless here might be additional factors such as wind direction and spee hat could affect these trace gases concentration.

دراسة علاقة تغير الأشعة فوق البنفسجية الساقطة على (منى) مع غاز الأوزون السطحي

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الملخص

إن الأشـعة فـوق البنفـسجية تلعـب دورا فعّـالا في مجـال التفـاعلات كيموضوئية التي تحدث في الغلاف الجوي وهـذه الأشـعة يمكـن أن تتفاعـ ع بض الملوثات المنبعثة من وسائل النقل مثل غازأول أكسيد النيتروجين NO ثاني أكسيد النيتروجين NO_2 مؤدية بذلك إلى إصدار غازات أخرى ثانوي ـد تكـون أكثـر خطـورة وأثـرا علـى جـودة الهـواء ومـن ذلـك غـاز الأوزو ـسطحي O_3 وهـو مـن أكثـر الغـازات الـسامة والـتي تلعـب دورا هامـا ـ تفاعلات الكيموضوئية التي تحصل في الغلاف الجوي، هنا قمنا بقياس لأشعة فوق البنفسجية الساقطة على منطقة منى 412 m altitude, $21^{o}.25$ N, $39^{o}.52$ E خلال الفترة ٦- ١٤٢٤/١٢/١٨هـ والموافق (٢٨/

- ٢٠٠٤/٢/٩م) وذلك باستخدام مقياس الاشعاع فوق البنفسجي الكلي (Total UV Radiometer, TUVR) والذي يقيس في المدى الموجي القصير (295 nm - 385 nm)، كما ناقش البحث علاقة تغير الأشعة فوق البنفسجية الساقطة على "منى" مع تغير زاوية السمت الشمسية وتغير أحوال الطقس من سماء صافية إلى سحب جزئية حيث بلغ مقدار الأشعة الساقطة على منى في حالة السماء الصافية قرابة ٣٩ واط/م٢ في حين انخفضت هذه القيمة إلى حوالي ٣٣ واط/م٢ عند وجود السحب، كما تمّ قياس غاز الأوزون السطحي باستخدمت جهاز تحليل الأوزون عن طريق قياس الشدة الضوئية فوق البنفسجية (UV Photometric Ozone Analysis) وكذلك كلا من NO و NO_2 باستخدام جهاز تحليل أكاسيد النيتروجين عن طريق قياس الضيائية الكيميائية (Chemiluminescent NO_x Analysis) حيث بلغت أعلى قيمة لتركيز غاز NO لمدة الساعة الواحدة طيلة فترة الدراسة ٢٦. ميكروغرام/م٣ ولغاز NO_2 ١٨٤ ميكروغرام/م٣ ولغاز O_3 ٧. ميكروغرام/م٣ ومعظمها ضمن الحدود الآمنة المسموح بها من قبل منظمة الصحة العالمية كما قمنا بحساب مقدارالتوافق في السلوك بين تراكيز هذه الغازات والأشعة فوق البنفسجية الساقطة حيث وجدنا توافقا كبيرا في السلوك (٧٥٪) بين زيادة تركيز غاز الأوزون السطحي والأشعة فوق البنفسجية الساقطة، في حين انخفضت هذه القيمة إلى حوالي (٦٨٪) في حالة غاز NO_2 مع أن المتوقع أن تنخفض هذه القيمة لأقل من ذلك بكثير نظرا لانحلال غاز NO_2 بالأشعة فوق البنفسجية وهذا يؤكد وجود مصادر أخرى

هذا الغاز في الهواء غير احتراق وقود الحافلات اضافة إلى احتمالية وجود حال
الاستقرار الضوئي خاصة عند منتصف النهار، أما في حالة غاز NO فقد
كان هناك اعتمادا ضعيفا على هذه الأشعة حيث كان معامل التوافق بين
تركيز غاز NO والأشعة فوق البنفسجية مساويا لـ ١٣٪ وهذا يؤكد وجود
حالة الاستقرار الضوئي ويؤيد أن معظم مصادر غاز NO من احتراق الوقود
الناجم من عوادم عربات النقل الموجودة في "منى". كما تمَ دراسة أثر بعض
العوامل الجوية مثل سرعة واتجاه الرياح على تركيز بعض هذه الملوثات.

Average Surface Albedo Measurements in the UV, IR and TSR on the Holy Mosque and Places in Makkah, Saudi Arabia

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Abstract

Average albedo values were measured at three broa vavebands; UV region (295 - 385 nm), Total Solar Radiation, TSR 305 - 2800 nm), and IR region (3500 - 50000 nm), over differen urfaces in the Holy Mosque and Places in Makkah (21^{o}.25 N 9o.49 E). The Eppley Laboratory Radiometers of TUVR and PII vere used for UV and IR measurements respectively, while Kipp & Zonen Pyranometer of CM3 was adopted for the TSR observations Measurements were performed during two different period summer 28/7-10/8/2004 at Holy Mosque and winter 18-30/1/200 t Holy Places). Summer measurements showed that the averag urface albedos of the Holy Mosque white marbles were 45%, 70% nd 114% at UV, TSR and IR regions respectively. These value ave decreased to 12% and 18% at UV and TSR region espectively over the Holy Mosque brown marbles. However, th verage albedo value has increased to 138% at IR region due to th arge Longwave radiation emission from the brown marbl urfaces. The albedo values of the Holy Mosque red carpets wer

letermined. The average albedo values were also measured ove he Holy Places surfaces (18 m) of pilgrimage, (Muna and Arafa ites) during winter 2005. The observed average surface albed alues over Arafat selected area were 0%, 22% and 118% at UV TSR and IR regions respectively. The average albedo values ove Iuna selected area and Muna tents were also presented. The effec f clouds and solar zenith angle (SZA) on the measured albed vere investigated in this study.

دراسة انعكاسية (Albedo) الأشعة الشمسية الساقطة على المسجد الحرام والمشاعر المقدسة

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الملخص

امت الدراسة بقياس متوسط انعكاسية (Albedo) أشعة الشمس
ساقطة على أسطح مختلفة بالمسجد الحرام (الرخام الأبيض، والرخام البني
السجاد الأحمر) وكذلك على أسطح المشاعر المقدسة (عرفة ومنى) بمك
لكرمة $(21^{O}.25$ N, 39o.49 E) في أوقات مختلفة، وقد شملت
دراسة كلاً من الأشعة فوق البنفسجية، UV، (295 - 385 nm)
الإشعاع الشمسي الكلي، TSR، (305 - 2800 nm) والأشعة تحت
حمراء، IR، (3500 - 50000 nm). وتم تنفيذ الدراسة على
ترتين خلال عام ١٤٢٥هـ الأولى أثناء فصل الصيف بالنسبة للمسجد الحرام
الثانية أثناء موسم الحج بالنسبة للمشاعر المقدسة لنفس العام، وقد أوضحت
دراسة أن قرابة ٤٥٪ من الأشعة فوق البنفسجية الساقطة على الرخام الأبيض
نعكس ثانية نحو أعين رواد المسجد الحرام أثناء سيرهم عليه كما زادت
ذه النسبة إلى ٧٠٪ بالنسبة للإشعاع الكلي في حين إرتفعت هذه القيمة إلى
والي ١١٤٪ في حالة الأشعة تحت الحمراء نظرا لارتفاع مقدار الإنبعاث

الإشعاعي الحراري ذو الأطوال الموجية طويلة المدى من سطح الرخام مقارنة
تلك الساقطة من السماء. أما في حالة الرخام البني انخفضت هذ
الإنعكاسية إلى حوالي ١٢٪ و١٨٪ في حالة الأشعة فوق البنفسجية والإشعا
الكلي على الترتيب بيد أنها إرتفعت إلي قرابة ١٣٨٪ في حالة الأشعة تحت
الحمراء نظر لشدة الإنبعاثية الحرارية من الرخام البني. أما فيما يخص
قياسات الإنعكاسية عل المشاعر المقدسة والمحتوية على عدد كبير من الخيا
البيضاء فقد وجد على سبيل المثال أن مقدر هذه الإنعكاسية كان مساوي
الصفر بالنسبة للأشعة فوق البنفسجية وقرابة ٢٢٪ و١١٨٪ بالنسبة للإشعا
الكلي والأشعة تحت الحمراء على الترتيب مع العلم أن هذه القيم إرتفعت على
لخيم منى إلى حوالي ١٥٪، ٣٣٪ و١٢٤٪ بالنسبة للأشعة فوق البنفسجي
الإشعاع الكلي والأشعة تحت الحمراء على الترتيب في حين كانت
انعكاسية الخيام المباشرة لهذه الأشعة تصل إلى قرابة ١٩٪، ٤٢٪ و١١٨٪ على
الترتيب. وأخيرا ناقشت هذه الدراسة أثر السحب وزاوية سقوط أشعة الشمس
السمتية على الإنعكاسية.

LASER BASED SENSOR FOR OZONE DETECTION IN THE ENVIRONMENT

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Abstract

Ozone is an important trace gas in our atmosphere that ha oth beneficial and damaging effects. Stratospheric ozone has eneficial effect for life on earth since it acts as a filtering agent fo lamaging ultraviolet radiation emitted by the sun. However, whe t is photo-chemically produced in the troposphere (at low altitude nd ground level) to noticeable concentrations, ozone can be toxi nd can result in significant physiological and ecological damage Ground-level ozone is produced by reaction, at low altitudes etween nitrogen dioxide, oxygen, and hydrocarbons in th resence of sunlight. Tropospheric ozone is the main component o he photochemical smog and is regarded as a greenhouse ga ontributing 9% to the anthropogenic global warming because it trong absorption band is centered at 9.6 mm.

Ozone may cause different kinds of allergies such as irritatio o the eyes and air passages causing breathing difficulties. It ma ncrease susceptibility to infection. Even at low levels, ozone ha een linked to increased hospital admissions and emergency roon isits for respiratory problems. It is also a highly reactive chemica apable of attacking surfaces, fabrics and rubber materials.

In order to understand the complex nature of ozone generatio nd its injurious effects on our environment, health, agriculture an limate, the accurate measurements of ozone profiles in urban an ndustrial districts are required. In order to achieve thes bjectives, adequate instrumentation and devices are needed whic

re sensitive enough to record trace amounts of ozon oncentrations at these places.

A variety of techniques have been developed to measure ozon uch as *UV* absorption, DOAS *(Diffrential optical absorptio pectroscopy)*, and chemi-luminescence. We are developing hotoacoustic spectrometer to perform such measurements. Ou hotoacoustic spectrometer, developed at our laboratory, has bee pplied successfully for detection of trace gases such as Ethylene SF_6, NO_2 and SO_2

The photoacoustic effect is the process of acoustic wav generation in a gas phase sample resulting from the absorption o modulated laser radiation. The acoustic detector is a microphon placed in a cell called photoacoustic cell.

In Most of the previous works published elsewhere an arried out in our laboratory, the laser beam is modulated using mechanical chopper. The main problem with chopper modulation i he stability of the chopper frequency. A minor change (1 Hz) in th modulation frequency could reduce the photoacoustic signal by a rder of magnitude at a photoacoustic resonant mode of th hotoacoustic cell. To overcome this problem, we are developing hotoacoustic spectrometer where CO_2 laser beam is modulate lectronically. Our preliminary results shows that the electroni modulation of CO_2 laser beam may improve the sensitivity of ou pectrometer by a factor of 5.

The parametric dependence of photoacoustic signal on lase power, modulation frequency, trace gas concentration, pressure o he buffer gas inside the photoacoustic cell will be investigated. A omparison between the two modulation techniques will b presented for detection of trace gases such as O_3, C_2H_4, and SF_6 a he time of conference.

Solid State Dye Laser synthesized by gamma irradiation polymerization method

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Key Words:

olid State Dye Laser, Pyrrome thene, P(MMA-HEMA) copolyme luorescence analysis, gamma irradiation, polymerization.

Abstract

Solid state dye laser (SSDL) monomers of pyrromethene 56 lissolved in ethanol and added in a 2-hydroxyethyl-methacrylat nethyl-methacrylate (volume mixture 1:1) copolymerized b gamma irradiation method (GIPM). The resulted optical propertie ompared with sample copolymerized by conventional therma olymerization method (CTPM) using Oven, and the results hav een investigated. The processability time has been reduced b 0% when GIPM method was used. This new method o rocessability, to the best of our knowledge, is the fastest way i abricating solid state dye laser samples so far. Polymerizatio rocesses started between 6-8 kGy dosages and no sign o olymerization was recognized less than this range. Th olymerization time was reduced from 8 days in the case of CTPM nethod to less than 2 hours in the case of GIPM method. N

nitiator was used in the case of GIPM method. The cross link wa nhanced due to the formation of free radicals by irradiation. Bot amples pumped with Nd:YAG of 532nm having 6 mJ/pulse, 4 Hz nd 10 ns. The fluorescence spectra of the sample copolymerize y GIPM method reveal higher intensity by a double than th ample copolymerized by CTPM method. The lasing spectr howing a maximum wavelength of 573 nm and 568 nm for sampl opolymerized by CTPM method and sample copolymerized b GIPM method, respectively. The photostability of the sampl opolymerized by GIPM method shows a significant enhancemen on the laser action. This is up to 45% compared with sampl opolymerized by CTPM method using AIBN initiator. Lasin fficiency of up to 35% and high stabilities have been obtained.

الجلسة العلمية السابعة

الفيزياء الإشعاعية الطبية

الخميس ٢٢/١٠/١٤٢٦هـ الموافق ٢٤/١١/٢٠٠٥م

الساعة ٩:٠٠ ــ ١١:٠٠

Skin Dose Distribution Measurements and Calculations for Nuclear Fuel Fragment Particles

Abdulkadir Sh. A. Al-Aydarous

The Effect of Air-Gap on Scatter to Primary Ratio in Mammography Using Monte Carlo Simulation

Ahmad Nobah , N Maalej, A A Naqvi, M A A Kafi

Monte Carlo Simulation Studies of Scatter to Primary Ratio for Mammographic Imaging

M A A Kafi, N Maalej, A A Naqvi, A Nobah

Comparative study of atomization of O2 in glow discharges in Ar O2 and He-O2 gas mixtures

Mohammad Aslam Khan and Abdulaziz M. Al-Jalal

Combined Multiple-Trapping and Electron-Hopping Transports in disordered Semiconductors under Steady State Photoexcitation - Application to hydrogenated amorphous silicon

A. Merazga, S. Tobbeche

Skin Dose Distribution Measurements and Calculations for Nuclear Fuel Fragment Particles

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Abstract

This paper summarises the development and evaluation o everal high sensitivity imaging techniques for the measurement o patial and depth dose distributions from exposure to fragments o rradiated nuclear fuel “hot particles” that have been found in th nvironment. Validation of the dose measurement and calculatio echniques was made by using well defined model hot particl ources which would allow parallel measurements and calculation o be critically compared. Direct measurements of the skin dose rat 1 cm2, 7 mg cm-2) from such finite sized beta sources wer neasured in detail for the first time using radiochromic dye film Monte Carlo code calculations of the doses are in good agreemen vith measurements, taking into account variations to be expecte lue to differences in shape (which have been calculated to b vithin a factor of ~ 2), and of the increasing importance of sel

bsorption for the larger, more active fragments. There is littl vidence for wide variations in the ^{137}Cs: $^{90}Sr/^{90}Y$ ratio betwee ragments. A dose rate survey instrument (SmartION) was show o provide a rapid and convenient method for skin dose assessmen rom particles in the activity range measured (2 x 105 – 2 x 107 B 37Cs). A conversion factor multiplier of 240 can be applied to th SmartION scale reading to estimate the skin dose rate to (1 cm2, ng cm-2).

قياسات وحسابات توزيع الجرعات الإشعاعية الممتصة بواسطة الجلد والناتجة من جسيمات شظايا الوقود النووي

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هذا البحث يلخص العمل الذي تم إنجازه في تطوير بعض أنظمة التصوي
الية الحساسية والتي وظفت لقياس توزيع الجرعات الإشعاعية الناتجة م
شظايا النووية والباعثة لأشعة بيتا. وقد تم ذلك باستخدام نماذج من مصاد
شعة صنعت بمواصفات وخصائص معروفة يسهل بعدها عمل مقارنة م
سابات مونت كارلو. وتم قياس الجرعات الممتصة بواسطة الجلد من هذ
شظايا (على مساحة $1Cm^2$ وعمق $7\ mg\ cm^{-2}$) باستخدام أفلا
الريديو كروميك داي). وقد أظهرت النتائج الحسابية من برنامج المحاكا
ونت كارلو توافقاً جيداً مع النتائج التجريبية، مع الأخذ في الاعتبار
لاعتبار الاختلاف الكبير في أحجام وأشكال هذه الشظايا وأيضاً من ظاهر
لامتصاص الداخلي. من هذه الدراسة أيضاً تبين أنه لا يوجد هناك دليل واض
لى أن الجرعات المقاسة تتغير بشكل كبير مع تغير النسبة بين ^{137}Cs:
$^{90}Sr/^{90}Y$. وقد استخدم جهاز المسح الإشعاعي (SmartION) كوسيل
سريعة وتقريبية لقياس الجرعة من مثل هذه الجسيمات المشعة والتي يتراو
شاطها الإشعاعي ($2\ x\ 10^5 - 2\ x\ 10^7$ Bq ^{137}Cs). ووجد أن معامل
تحويل والذي يمكن أن يطبق على هذا الجهاز لكي يقدر معدل الجرع
لمتصة على الجلد أنه يساوي 240.

The Effect of Air-Gap on Scatter to Primary Ratio in Mammography Using Monte Carlo Simulation

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Abstract

Breast cancer is the most common cancer in women, not onl n Saudi Arabia, but also all over the world. If diagnosed an reated at in early stages, the chance of survival for breast cance atients improves. Mammography has been extensively used for th creening of breast cancer. However, according to data from th Breast Cancer Detection Demonstration Project in the US, th alse-negative rate of mammography is approximately 8-10%. Th oreast tumor tissue has similar x-ray attenuation characteristics a oreast glandular tissue and may not be clearly distinguished in nammogram. X-rays may be scattered at an angle (scatter) or ma ravel without interaction (primary). Scattered x-rays blur th mage and reduce the contrast between the tumor and it urrounding normal tissue. Besides grids, an air-gap between th oreast and the detector plane can be used to reduce the amount o cattered radiation. We used Monte Carlo Simulation Code MCNP o evaluate the effect or an air-gap on the amount of scattere adiation relative to primary radiation (Scatter to Primary Rati

SPR). We used materials and geometrical dimensions that ver closely mimic the clinical situation. We also used x-ray spectra tha re dependent on the tube voltage and are very similar t xperimental spectra for a Molybdenum anode and filter. The SP was observed to decrease with increasing air-gap, both i nagnification (6-30 cm) and non-magnification (1.5-3 cm) modes However, increasing the air gap increases the magnification an educes the image resolution. Hence, in using an air gap to reduc catter we have to make a trade-off between contrast and resolutio both of which are very important image quality parameters for th letection of breast tumor masses and micro-calcifications.

Monte Carlo Simulation Studies of Scatter to Primary Ratio for Mammographic Imaging

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Abstract

Breast cancer is the most common cancer in women in Saud rabia and all over the world. Early diagnosis and treatmen mproves the chance of survival for breast cancer patients Iammography has been extensively used for the screening o reast cancer. However, the rate of false negatives and fals ositives in diagnosing breast cancer using mammography is sti igh. Scattered x-rays are one of the main factors that blur th mage and limit the ability of the radiologist to detect the tumor i nammograms. We used Monte Carlo Simulation Code MCNP5 t valuate the amount of scattered radiation relative to primar adiation (Scatter to Primary Ratio SPR) for different x-ray tub eak voltage (kVp) and breast thicknesses. We used materials an eometrical dimensions that very closely mimic the clinica ituation. We also used x-ray spectra that are dependent on the tub oltage and are very similar to experimental spectra for Iolybdenum anode and filter. The SPR was observed to increas vith breast thickness. The SPR is maximum at the center of mas f the exposed breast and diminishes close to the edges of th

reast. The SPR did not change significantly with the kVp for th
linical range from 24 to 36 kV. The obtained SPR and it
lependence on breast thickness and kVp data were validate
gainst data obtained from mathematical calculations and clinica
neasurements obtained from the literature. Very good agreemen
less than 5% difference) was found between the MCNP result an
iterature. Current results and future studies to optimiz
nammography imaging will be presented.

Comparative study of atomization of O2 in glow discharges in Ar-O2 and He-O2 gas mixtures

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Atomic oxygen (O) is very useful in many chemical an naterial processing applications. However, production of a larg umber of O atoms for these applications in glow discharges i ure O^2 has been difficult due to several reasons. We have recentl nvestigated atomization of O^2 in a glow discharge in Ar-O^2 ga nixture for possible use in decoking of coked refinery catalysts. A hirty-fold increase in the population density of O atoms in th lischarge was recorded compared with the discharge in pure O^2. A nteresting observation was the presence of continuum spectra du o Ar^{2+} ions in a discharge in pure Ar that disappeared when a smal mount of O^2 was added to the discharge. This suggested that trong channel of energy transfer between Ar and O^2 involve esonant charge exchange between Ar^{2+} and O^2. The resulting O^2 nderwent dissociation after capturing a free electron.

A similar study in He-O^2 gas mixture is currently bein onducted in our laboratory to explore He^{2+} continuum an ossible resonant charge transfer to O^2. The results will b resented at the conference.

Combined Multiple-Trapping and Electron-Hopping Transports in disordered Semiconductors under Steady State Photoexcitation - Application to hydrogenated amorphous silicon

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Abstract

In this paper, conventional simulation of the Steady Stat Photoconductivity (SSPC) in disordered semiconductors i econsidered to include previously neglected carrier transition mong the localised states. Hydrogenated amorphous silicon (a Si:H) is taken as a typical material for this study. SSPC in a-Si:H i umerically simulated as a function of temperature over the whol xperimentally accessible range (20K-500K). In addition to norma ree carrier capture (emission) transitions into (from) differen ocalised states, we include the process of Electron Hopping (EH hrough the Conduction Band Tail (CBT) states. Exponentia istributions are assumed for the CBT and the Valence Band Tai VBT) states, while the distribution of the Dangling Bond (DB lensity is calculated by the Defect Pool Model (DPM). Localised xtended states Multiple-Trapping (MT) transitions follow th Simons and Taylor statistics and localised-localised states EI ransitions are described on the basis of the nearest neighbou opping approach. With decreasing temperature at moderate ligh ntensity, the EH mechanism starts having significant contributio

t about 110K, causing and increase of the SSPC activation energ in the intermediate temperature range (100K-70K). It the dominates the SSPC, leading to a constant SSPC below 50K ncreasing the doping degree from p-type to n-type, passing th ntrinsic state, affects considerably the region of extended state onduction above 110K by rising and shifting it towards highe emperature. It has little effect on the intermediate activated regio nd practically no effect on the constant SSPC dominated by EH These simulation results, showing an overall reasonable agreemen with experiment, are readily interpreted in terms of doping induce hanges in the DPM-DB defect charges on one hand and th elative contribution of EH to SSPC on the other.

eywords: *Multiple-Trapping; Electron-Hopping; Steady State Photoconductivity; a-Si:H.*

ملخصـــات
الأبحـــاث المعروضـــة

الأبحاث المعروضة

Rietveld analysis of amorphization reactions in Hf27Co73 system

A. Al-Hajry

Transient effects on the motion of atoms in Laguerre-Gaussian laser light

M. Al-Amri, A. R. Carter, M. Babiker and D. L. Andrews

Quantum interference and correlations near sharp wedges and at knife edges

M. Al-Amri, S. C. Skipsey, M. Babiker and G. Juzeliunas

Containment of cold atoms and Bos-Einstein condensates in metallic cavities

M. Al-Amri and M. Babiker

Channel coupling effects in heavyions colssions

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Indoor Radon Survey In The Academic Campus Of King Fahd University Of Peterolium And Minrels – Dhrahran – Saudi Arabia.

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The reversible magnetization in Tl(1223) high temperature Superconductor

Kh. A. Ziq and D. Alshangetti

Hydrogen effects on the critical current density in $GdBa_2Cu_3O_7$ high temperature Superconductor

Kh. A. Ziq and H. Qadi

Gamma radiation effects on the critical current density in $GdBa_2Cu_3O_7$ high temperature Superconductor

Kh. A. Ziq and H. Hashem

Scaling of the pinning force in MgB2 superconductor

Kh. A. Ziq, A. F. Salem, A. Ghannam and F. Enaya

Iron Doping of Semiconducting Bismuth Alkali Borate glasses

M. M. El-Desoky and A. Al-Shahrani

Rietveld analysis of amorphization reactions in Hf27Co73 system

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Abstract

$Hf_{27}Co_{73}$ amorphous phase was obtained by mechanica lloying (MA) of the elemental powders within five hours unde rgon atmosphere. This composition was chosen for its visibilit or X-rays, since the XRD diffraction pattern is normall lominated by the Hf element. However, the calculated XRI isibility, showed that in this particular composition, Co elemen an be easily detected. Rietveld analysis is used to study th lifferent amorphization stages, and some structural parameters ar lerived as a function of MA time. No intermetallic compound wa btained in this composition as obtained in the Hf50Co50 system Radial distribution function (RDF) showed that a single amorphou hase was obtained as the end-product of the amorphizatio eaction.

Transient effects on the motion of atoms in Laguerre-Gaussian laser light

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Abstract

It is well known that the translational motion of individua toms or molecules can be influenced by the radiation pressur orces exerted by laser light beams. If the light beam is endowe vith orbital angular momentum, there is, in addition, a ligh nduced mechanical torque which leads to a rotational motion of th toms about the beam axis. These effects arise from the angula momentum content of the light and have been the subject of muc nvestigation over the last decade or so. The trajectory of a give tom in a given Laguerre-Gaussian light beam depends on th nitial conditions at the instant the beam is switched on. Howeve nost treatments of radiation effects on atoms assume that th teady state forces and torques are operative during the whol notion. This assumption is clearly not justifiable in general.

We have found that the full time-dependence of the force nvolves a transient regime during which the atoms are subject t orces which differ markedly from their steady state forms and giv ise to new features in the subsequent dynamics, in both th ranslational and rotational motion, effectively modifying the initia onditions long before the steady state is reached. Th nvestigations require careful derivations of the transient force ising density matrix techniques which are then used to solve th

equation of motion leading to the trajectory. The theory is applied to rare-earth atoms, which possess relatively long time constants permitting transient effects to manifest themselves in the atomic translational and rotational motion when subject to Laguerre-Gaussian beams.

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Quantum interference and correlations near sharp wedges and at knife edges

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Abstract

It has long been realised that interesting physics should aris hen atoms and molecules interact with electromagnetic fields, no n free space, or unbounded media, but in a restricted space arisin n the context of artificially fabricated material structures.

The electromagnetic fields in this context are restricte patially because they have to satisfy appropriate boundar onditions at material interfaces, depending on the shape an omposition of the structure. Thanks to recent advances in materia leposition techniques and lithography, as well as the advances i letection techniques and optical manipulation, experimental wor s now capable of revelaing a new range of physical phenomen hen the typical dimensions are of the order of an optical dipol ransition wavelength and below.

Here we show that the rate of de-excitation of a dipole emitte s influenced markedly by its proximity to the tip of a wedg ormed by the intersection of two planar surfaces at an arbitrar ngle _0. We focus on the case of a dielctric wedge within a hig

onductivity bulk metal. Variations of the wedge angle 0^{o} from mall value to nearly 2^{o}, corresponding, respectively to a thi vedge and a needle, reveals remarkable variations with a wid ange of novel features. Besides position dependence the rat xhibits strong dipole orientational dependece suggesting that th ystem is a possible candidate as a qubit for a scalable hardwar rchitecture for quantum information processing.

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Containment of cold atoms and Bos-Einstein condensates in metallic cavities

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Abstract

There is currently much interest in the physics of cold atomi gases fuelled, possibly, by the repeated successes of experiment reating Bose-Einstein condensates (BECs) in many laboratories Iowever, the attainment of high density BECs possessing lon oherence lifetimes remains one of the primary goals in this field.

The controlled manipulation of dilute atomic gases invariabl equires a practical means to trap them in a suitable region of space t is generally perceived that a material container would b nappropriate as a component of an atomic trap. This is becaus toms approaching the container walls would be subject to th nfinitely attractive van der Waals potential well in which the vould fall and, so, become adsorbed to the wall.

This mechanism is one of the primary sources of loss limitin he coherence properties of the ensemble. A repulsive potential i hus required to counteract the effects of the van der Waal ttraction.

Here we explain why a system of cold Rb atoms a emperatures of the order T~ 7.8 × 10^{-5} K and below, including th ore Bose-Einstein condensation phase, should be automaticall epelled from the surface of a perfect conductor without the need o n evanescent field, to counteract the Van der Waals attraction. Th epulsive potential arises naturally outside the conductor and i ffective at distances from the conductor surface of the order o 00nm, intermediate between the van der Waals and the Casimi Polder regions of variation. Such a field-free reflection capabilit vould be useful as a component in cold atom traps. It should b oractically free of undesirable field fluctuations and would b operative at distances for which surface roughness and dissipativ ffects should be negligibly small.

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Channel coupling effects in heavyions colssions

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Abstract

Fusion of two heavy ions has customarily been described i erms of simple models which use one-dimensional potentials usion is then decided by the ability of the system to penetrat hrough or pass the potential energy barrier, and the model is ofte eferred as the barrier potential model (BPM) (Vaz et al. 1981) Iowever a number of experiments (Beckeman et al 1980, 1981 ahnke et al. 1982) have clearly shows that this standard model i nadequate.

Dasso et al. (1983) considered a more general framewor aking into account for the effects of the inelastic collisions an ransfer reactions. Their approach is based on the coupled channe ormalism and is formulated in the frame of the schematic mode eading to a system of two coupled differential equations for s state =0) in the one-dimensional case.

In this work, a method on the separation of couple lifferential equations developed by (Cao 1988) is applied to stud he channel coupling effect in the fusion theory for heavy ions. I he framework of the schematic model this method allows t nhance the investigation of states with ( ). Results ar presente or the system 58Ni-58Ni in the two-state approximation.

INDOOR RADON SURVEY IN THE ACADEMIC CAMPUS OF KING FAHD UNIVERSITY OF PETROLIUM AND MINRELS-DHAHRAN-SAUDI ARBAIA

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Abstract

The results of the indoor radon survey in the buildings of the academic campus of King Fahd University of Petroleum and Minerals (KFUPM) in Dhahran – Saudi Arabia will be presented. An active system was used in one hour cycles for 24hours in each measurement. The preliminary results showed that radon concentrations in the basement floors are higher than that in the upper floors of the same buildings

تركيز غاز الرادون المشع في المباني الاكاديمية المتعددة الطوابق.

لجامعة الملك فهد للبترول والمعادن

الظهران ــــ المملكة العربية السعودية

خالد عبدالله ، محمد بن ابراهيم الجار الله

جامعة الملك فهد للبترول والمعادن - صندوق بريد رقم ٧٧ - الظهران - ٣١٢٦١

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الملخص

يتم قياس تركيز غاز الرادون المشع في المباني الاكاديمية - المتعدد
طوابق- لجامعة الملك فهد للبترول والمعادن - الظهران - المملكة العربي
سعودية. وقد استخدم جهاز الكتروني يعطي قياسات مباشره لمعدل تركي
رادون كل ساعه وكانت مدة كل قياس ٢٤ ساعه . وسيتم مناقش
قياسات التي تم التوصل اليها في هذه الدراسة. النتائج الأولية تشير إلى أ
عدل تركيز الرادون في الطوايق الأرضيه أعلى منها في الطوابق الأخرى م
فس المبنى.

The reversible magnetization in Tl(1223) high temperature Superconductor

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Abstract

Reversible magnetization has been measured for various (T $Zn_x)Ba_2Ca_2Cu_3O_7$ high temperature superconductors doped wit Zn-ions at the T_e sites. Zinc doping has been found to reduce th hermodynamic critical field, and increase its temperatur lependence. Moreover, a significant increase in both the critic urrent density and the maximum in pinning force Pf(max) hav been found with increasing Zn concentration. These finding ar losely related to the behavior of the changes in the coherenc ength with the thermodynamic critical field where x=0.0-0.3.

Hydrogen effects on the critical current density in GdBa2Cu3O7 high temperature Superconductor

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Abstract

Magnetic measurements have been performed o $GdBa_2Cu_3O_7$ high temperature superconducting sample ydrogenated at 200-500K. Low temperature (≤ 300 °C ydrogenation has been found to enhance the critical curren lensity (*Jc*) and pinning forces (*Pf*). Close to the transitio emperature, these changes are non-monotonic. Hydrogenation a igher temperatures has been fond to rapidly degrade the volum raction of the superconducting state and significantly reduces bot *c* and Pf. Very little reduction in the transition temperature ha een observed in samples hydrogenated below 300 °C.

Gamma radiation effects on the critical current density in $GdBa_2Cu_3O_7$ high temperature Superconductor

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Abstract

Hysteresis loops measurements have been performed o $dBa_2Cu_3O_7$ high temperature superconducting samples irradiate vith various does of gamma radiation. Analysis of these loop eveals that low gamma does mainly affects grain boundaries, whil igh gamma dose affects interior of the grains by increasing th lensity of pinning sites. Very little reduction in the transitio emperature has been observed with gamma dose.

Scaling of the pinning force in MgB2 superconductor

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Abstract

Hysteresis loops measurements have been performed on MgB_2 superconductor. The thermodynamic critical field (Hc) has been used to search for universal behavior in the critical field and pinning force in the vortex state. This scaling behavior has been found to be having advantage over the traditional scaling behavior commonly applied to wide class of superconducting materials.

Iron Doping of Semiconducting Bismuth Alkali Borate glasses

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Abstract

Semiconducting oxide glasses in the Fe_2O_3 – Bi_2O_3 – Li_2B_4O ystem are fabricated by a press – quenching of the glass melt sing Fe_2O_3, Bi_2O_3 and $Li_2B_4O_7$ row materials and dc conduction i nvestigated. Density was observed to decrease with an increase i 'e$_2$O$_5$ content. The glasses are n- type semiconducting. Th xperimental data have been analyzed in the light of theoretica nodels. It has observed that the general behavior of electrica onductivity is similar for all glass compositions. The hig emperature conductivity data are consistent with Mott's models o honon – assisted polaronic hopping in the non- adiabatic regime The physical parameters obtained from the best fits of these model re found reasonable and consistent with glass compositions. Th onductivity was primarily determined by carrier mobility.

دراسة خواص الانتقال لزجاج البورون.
بزموت القلوى المطعم بالحديد شبه الموصل

د. محمد الدسوقى .د. عبد العزيز الشهرانى

ملخص

تم تحـضير الزجـاج شـبه الموصـل مـن الحديـد- البزمـوت ـ البـورا
قاعـدى بطريقـة الإخمـاده وأيـضا تمـت قيـاس التوصـيلية الكهربيـة للتيـا
لستمر في مدى من ٣٠٠ –٤٥٠ كلفن . وقد أظهرت قياسات الكثافة أنه
زداد مع زيادة أكسيد الحديد. ووجد أيضا أن الزجاج من نوع n . وقد ت
حليل نتائج قياس التوصيلية الكهربية باستخدام بعض النظريات .وق
ظهرت النتائج في درجات الحرارة المرتفعة التي تزيد عن نصف درجة حرار
يباى أن ميكانزم التوصيلية يتبع حجل البولارون الصغير الغير الإدياباتيكى.

Large Scale Structure of $Cu_{58}Zr_{42}$ System

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Abstract:

The amorphous phase of $Cu_{58}Zr_{42}$ System has been obtaine oy using mechanical alloying technique. The time required t chieve the amorphous state was 4h which is a very short period o nilling. The amorphous powders produced were subjected t nalyses using X-ray diffraction (XRD), neutron small angl cattering (SANS), differential scanning calorimetry (DSC) an canning electron microscopy (SEM). The crystallizatio emperature and the activation energy of the amorphous $Cu_{58}Zr_4$ lloy were obtained by using DSC instrument. The large scal tructure investigations obtained by SANS reinforced the therma nvestigations obtained by DSC measurements. Since the scatterin ength density of Cu and Zr are very similar, the SANS change bserved here give an indication of the topological variation of thi ystem. Graphs of Ln[I(Q)] vs. Ln(Q) are linear over a wide rang of scattering vector Q indicating the fractal nature of the structur of this alloy at different temperatures. The fractal dimensions I vere obtained as a function of different temperatures. These value epresent surface fractals rather than volume fractals.

دراسة خصائص كاشف تناسبي عادي عند ضغوط تصل إلى ١٠ ضغط جوي باستخدام خليط غازات Xe+20% Ar.

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ملخص

تتضمن الخصائص المبدئية المطلوبة من أي كاشف إشعاعي: فعالي لكشف و فدرة تمييز الطاقة و حساسية الكاشف لأنواع الإشعاعات لؤينة. وعند استخدام كاشف ما ، فإنه من المهم عمل موازنة بين الخصائص لطلوبة من ذلك الكاشف والحدود المقبولة منه. وعند استخدام كواشف لاشعاع الغازية، فإن أحد أهم عيوبها هو ضعف حساسيتها للطاقات العالية لأمر الذي يحتم زيادة ضغط الغاز المستخدم، الذي يؤثر بالتالي على أدا خصائص الكاشف. تقارن هذه الورقة أداء كاشف إشعاعي تناسبي عادي ند ضغوط مختلفة من ١ حتى ١٠ ضغط جوي، وذلك باستخدام خليط Xe+20%A. هذا الخليط أظهر أفضل الخصائص مقارنة بالمخاليط الأخر تي تمت دراستها. شملت الدراسة مقارنة الكسب (G) وكذلك قدرة تميي طاقة (E.R) للكاشف عند الضغوط المستخدمة، حيث بينت النتائج مد أثير ضغط الغاز على هذين المتغيرين. وجد أنه عند كسب مقداره ٢٠٠ ، فإ درة تمييز الطاقة (٢٢ ك.إ.ف) للكاشف تنحدر من ٦٪ إلى ١٦٪ عن ضغوط ١ و ١٠ ضغط جوي على الترتيب.

Characteristics of a Xe+20%Ar Proportional Counter at Gas Pressures up to 10 atm

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Abstract

The basic characteristics of any radiation detector include: th letection efficiency, energy resolution and sensitivity to the variou onising radiations. It is necessary to compromise between th lesirable and acceptable limits of the performance of a detector. A mportant disadvantage of gas radiation detectors is the lov ensitivity for higher energies, which make it necessary to increas he gas pressure. Increasing gas pressure will then affect th letector performance. In this study, a conventional proportiona ounter filled with Xe+20%Ar mixture was investigated at ga pressures up to 10 atm. This mixture was found to show the bes haracteristics among other mixtures studied. The results, in term of gas gain and energy resolution, are presented. The effect of ga pressure on gas gain and energy resolution is described. At gas gai of 200, the energy resolution (for 22 keV) was found to degrad rom 6% to 16% at pressures of 1 atm and 10 atm respectively.

Electronic and Crystalline Structure of Carbon Oxide (CO)›› Adsorbed on MgO(001) Surface.››

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Abstract

The interaction of CO molecules on the MgO(001) surfac vas studied theoretically by means of CRYSTAL98 software. W ısed both Hartree-Fock and density functional theory(DFT nethod. B3LYP and B3PW hybrid approximation was performed An optimization procedure of adsorbate and substrate atom position on one, two and three slab model has been selected t letermine the corresponding lattice parameters. Adsorption an ateral energies, charge distribution, density of state and ban tructure are performed for CO/MgO(001) system. In this work w ısed different coverage (θ=1, 1/2, 1/4, 3/4). In each case w ound the character of the interface.

Non-Destructive Analysis of Sulfur in Concrete Samples for Corrosion Studies

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Abstract

Measurement of sulfur and chlorine in concrete is ver mportant for studying corrosion of reinforcing steel in concrete Chlorides cause the corrosion of reinforcement steel while th presence of sulfate ions in concrete along with chlorides appears t ccelerate reinforcement corrosion. Preventive measures fo voiding reinforcement corrosion in concrete structure require nonitoring the chloride and sulfate ion concentration in concrete s hat their concentration does not exceed threshold limits to initiat einforcement concrete corrosion. Prompt Gamma Neutro Activation Analysis (PGNAA) technique has been use uccessfully in non-destructive elemental analysis of light element uch as chlorine, sulfur etc., in bulk samples.

An accelerator based PGNAA setup has been developed fo non-destructive analysis of elemental composition of concret amples. The KFUPM accelerator-based PGNAA setup mainl onsists of a cylindrical sample enclosed in a rectangular paraffi

moderator. The moderator is placed between a neutron target and cylindrical NaI gamma ray detector having a dimension of 25.5 cm x 25.5 cm (diameter x height). The 2.8 MeV neutrons from the D(d,n) reaction are thermalized in the moderator and are captured in the concrete samples. The sulfur gamma rays produced in the concrete samples, containing known amount of sulfur, were detected by a NaI gamma ray detector. In spite of strong interference between prompt gamma rays from sulfur and silicon in the concrete sample, sulfur concentration in concrete samples was determined using 5.42 MeV capture gamma ray in sulfur. Results of this study will be presented in this paper.

أساليب مقترحة لتطوير التعليم الجامعي في علم الفيزياء بالمملكة العربيّة السعوديّة

مهنّد بن جبريل أبو ديّة، عبد الله بن سعيد بازياد، عبد الله بن فهد التركي،

د. زين بن حسن يماني

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الملخّص

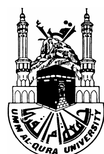
تطرح ورقة العمل هذه بعض الأفكار العملية المنهجية وغير المنهجي
لرقي بتعليم الفيزياء وبمستوى الطلبة في الجامعات السعودية، عن طري
رامج تمت مناقشتها مع الطلبة وأخرى مستمدة من كبار الجامعات العالمي
سباقة في هذا المضمار مع دراسات واستطلاعات في هذا الموضوع.

تبدأ الورقة بالحديث عن أساليب تعليمية متبعة في بعض الجامعات
لعالمية وعن فاعليتها وإمكانية تطبيقها في الجامعات السعودية، كما تت
لإشارة إلى أساليب مقترحة من قبل بعض الطلاب للاستفادة المثلى من الكت
لدراسية والمراجع الخارجية وحصص المعامل وحصص حل المسائل والموا
لاختيارية والتعليم الإلكتروني.

ثم تتم مناقشة أساليب أخرى غير منهجية (أي: لا صفيّة) مع شر
هدافها مع طرح برنامج وطني مقترح لها، وتشمل: ورش العمل المتخصص
غير المتخصصة، والمسابقات الفيزيائية، واللقاءات العلمية الطلابية، وأنواع
لحلقات البحثية وطرقاً لربطها بالمناهج الدراسية،- والدورات العلمي
لتخصصة، والمشاريع الطلابية المشتركة، والمحاضرات غير التخصصية ودو
طلاب فيها، والدعم البحثي المتكامل للطالب، وغيرها من البرامج.

إن هذه الورقة محاولة لتحديث أساليب التعليم في المؤسسات الأكاديمي
يما يختص بعلم الفيزياء والعلوم المتعلقة بها.

وتتضمن الورقة التنويه بأهمية إنشاء قسم طلابي بالجمعية مع ذك
هم أهدافه، والخطة المقترحة له، والفعاليات التي يمكن أن يساهم به
رقي بمستوى التعليم الجامعي للفيزياء في المملكة العربية السعوديّة.



مطابع جامعة أم القرى